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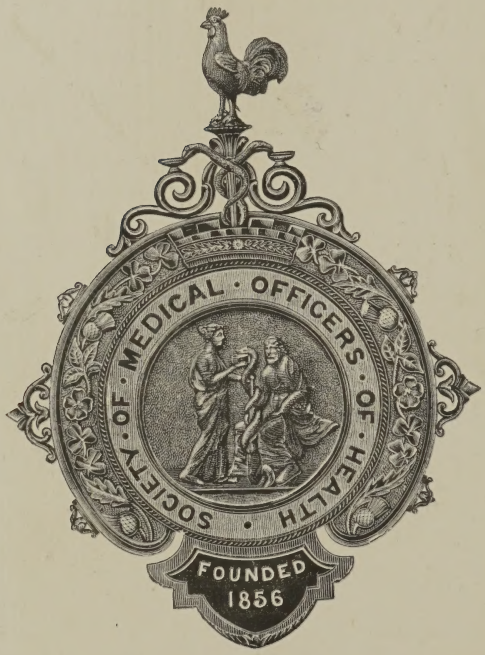

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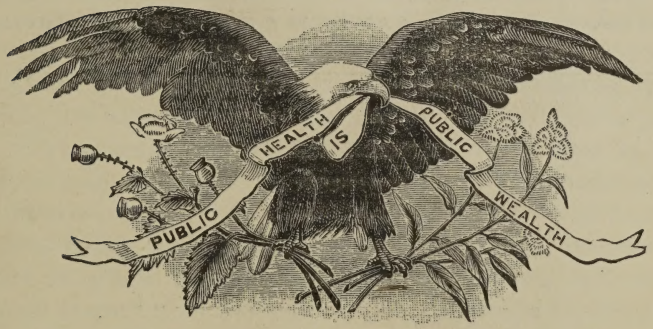
A MONTHLY MAGAZINE

DEVOTED TO THE

PRESERVATION OF HEALTH, MENTAL AND PHYSICAL CULTURE.



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THE SANITARIAN.

JANUARY, 1890.

NUMBER 242.

CIVIC CLEANLINESS.*

By J. S. COLEMAN, Commissioner of Street Cleaning, New York.

CIVIC cleanliness is a subject which invites the most serious attention of all intelligent people, because the health and comfort of individuals and communities are involved therein and affected by it to the extent that it is attained or disregarded. Wherever masses of human beings congregate, whether in cities, towns, or villages, or in armies in the field, camp, or barrack, an artificial existence to a certain extent springs up. Each individual is no longer dependent upon himself; the habits of those around him influence his own position. The preservation of the health of every class in the community is equally important to the rich and to the poor. It is important to the wealthy that the poor should be kept in good health, for the influence of infection, once introduced into the dwellings of the poor, often spreads far and wide, and is no respecter of persons. It is important to the poor man, as his health is his wealth.

Pure air is as essential for life and health as pure water and nutritious food—any one of which once used or combined with matter of a deleterious character loses its vital property and becomes as it were poison. The breathing of vitiated air lowers the natural vitality so as to render the human subject susceptible to disease. Therefore the great principle to be observed in relation to the health of cities is, that whatever tends to vitiate the atmosphere must be eradicated as soon as

* Address at the Brooklyn Institute, November 29th, 1889, in the course on the "Promotion of Health," in connection with the Brooklyn Health Exhibition.

possible—that every decomposable substance should be removed and destroyed without unnecessary delay.

Those communities that are in a bad sanitary state are considerable losers. If upon no other but economical grounds, it is true economy to spend some little of our earnings in the prosecution of sanitary works. Health is the capital of the laboring man. It is better to give health than alms, for an unsanitary state brings sickness, disease, and mortality, which are followed by pauperism, demoralization, and crime. "To preserve health," says Dr. Johnson, "is a moral and religious duty; for it is the basis of all social virtues. We can be useful no longer than we are well." Napoleon, from the result of long experience in the hygiene of armies, greatly valued sanitary measures. One of his remarkable sayings was: "Water, air, and cleanliness are the chief articles in my pharmacopœia."

In the category of sanitary works most necessary for the promotion and preservation of the health of cities, that of street cleaning, in the widest significance of the term, ranks among the highest; and to-day there is no more important problem under consideration by health officers and others directly charged with the prosecution of such work, than the most effectual means of disposing of city refuse. Populations living amid filth, and within the direct reach of its polluting influence, succumb to various diseases, which under opposite conditions are comparatively or absolutely unknown; and the broad knowledge that filth makes disease is amply represented in the oldest records that exist of legislation meant for the masses of mankind. The Right Hon. Dr. Lyon Playfair, in his address at the Social Congress at Glasgow, 1874, speaking of the good that had arisen from the prosecution of sanitary works, and as an example of the gradual improvement in the public health from the adoption of sanitary measures, cited the following statistics of the death-rate in London:

1660–79, the death-rate was 80 per 1000; 1681–90, the death-rate was 42.1 per 1000; 1746–55, the death-rate was 35.5 per 1000; 1846–55, the death-rate was 24.9 per 1000; 1871–80, the death-rate was 22.6 per 1000; 1881–87, the death-rate was 20.3 per 1000. The present death-rate is about 18.5 per 1000.

"The New York law creating the Department of Street Cleaning, known as chapter 367 of the Laws of 1881, passed May 26th, 1881, was enacted to meet an emergency—in response to a general demand for a change in the administration of the work of street cleaning. The bill was hurriedly drawn, and the purpose of its originators seems to have been, while creating an independent department of the City Government, to avoid conflict with the other departments having relative responsibilities as regards the care and maintenance of the streets and their sanitary condition. Thus the Department of Street Cleaning was left without any power within itself to remedy the numerous hindrances that it encounters to the proper performance of its work. Repairing the pavements, opening the streets for the purpose of laying pipes or making sewer, gas, and water connections, sprinkling the streets, and removing the obstructions from them, and such like work appertaining to the work of street cleaning; and the power to grant permits and impose conditions for such work, and to enforce the ordinances directly bearing upon the work of street cleaning, should, in my opinion, be vested in the Department of Street Cleaning. Then, instead of the roundabout process now necessary in order to have a complaint remedied, involving sometimes irritating delay, citizens could have immediate recourse to the Department possessing sole power and responsibility in the premises, and could confidently look for speedy and effectual relief. Under the present order of things, the citizen is absolutely at sea as to where the jurisdiction reposes affecting the grievance he suffers from—dusty streets, closed culverts, neighbors having insufficient receptacles, unemployed trucks encumbering the streets, etc., and it is not to be wondered at that at times he will make the mistake of sending his letter to that department which has no jurisdiction as to his complaint, and which in turn is obliged to forward it to the proper department.

"The divisions of authority and responsibility in relation to the streets are perplexing and often absurd, and it has sometimes happened in my experience that even officials themselves have been puzzled and have erred as to the proper reference to be made with a view to securing the remedy for an existing evil.

"It is very evident that remedial legislation has become a necessity. It is not my desire to interfere with the prerogatives of any other branch of the City Government; but yet it is my conviction, which an experience of eight years in administering the affairs of this Department has fully matured, that the public welfare demands the concentration of all matters pertaining to the condition of the streets in one bureau or department, under one responsible and accountable officer. Therefore, I would recommend that either the present Department of Street Cleaning be abolished and made a bureau in the Department of Public Works or the Board of Health, or that the scope of its duties and responsibilities be enlarged and extended so as to include in its jurisdiction all matters appertaining to clean, well-kept, and unobstructed streets."

My connection with civic cleanliness is wholly a practical one—relating to the prosecution of the work of street cleaning, and the removal of ashes and house-refuse from all over the city of New York, amounting in all to about 1,500,000 cubic yards yearly, or nearly a cubic yard for each inhabitant; and requiring the employment of about 2000 persons, which, in New York City, with its 1,750,000 inhabitants, is a very serious responsibility.

Preliminary to the remarks and suggestions I am about to make, and without going into detail, I will quote a few statistics that will give an idea of the vastness of the work of street cleaning in New York City; although our system is far from perfect, for the reasons that I have stated in my last annual report on pages 18 and 19, as just above quoted.

There are many deductions to be drawn from our plan of work that will be of interest to the person who gives attention to and is in sympathy with the progress of sanitary science throughout the world:

The amount of ashes and garbage collected in the city of New York from 1881 to 1888, inclusive, was close on to 11,000,000 cubic yards. The amount of street sweepings collected for the same period was close on to 3,000,000 cubic yards; making a total of about 14,000,000 cubic yards of street sweepings and refuse collected and disposed of by the Department of Street Cleaning in seven years. The amount of money ex-

pended during the same period was about $7,500,000. The roadways not under the special care of the Department of Public Works and Park Department, representing 328.66 miles, with an estimated superficial area of about 7,000,000 square yards, is swept by the Department of Street Cleaning as often as required—that is to say, the most important streets and avenues are swept once every day ; those with less traffic every second day ; the residential or outlying neighborhoods once or twice a week ; while, from the whole mileage of streets in the city (574.88), the ashes and garbage are taken up thoroughly every day. For the economic supervision and the prompt and efficient performance of the vast amount of work to be done, the whole city is divided into four districts, with Broadway as the dividing line below Fourteenth Street, Seventh Avenue as the dividing line above Fourteenth Street as far as Forty-second Street, and Sixth Avenue, from Forty-second Street to the Harlem River. Fourteenth Street, running at right angles to Broadway, marks the boundaries of the four districts. The districts are subdivided into precincts, nearly corresponding to the police precincts. Each district is in charge of a superintendent, and each precinct in charge of a foreman, who has an assistant and a force of laborers, cartmen, and sweeping appliances proportionate to the amount of work to be done. Along the North and East rivers dumping-boards are located at convenient distances. The material collected from the precincts is taken to these places and emptied into scows for removal to the several dumping-grounds.

The daily collection and removal of ashes and garbage from all the streets of the city constitutes the heaviest portion of the work to be done. The garbage of hotels and large restaurants, having a market value, is sold to private parties and removed without cost to the city. The removal of night-soil is done under the direction of the Board of Health, and the removal of encumbrances from the streets and sidewalks, and of dirt from sewer-basins, is done under the direction of the Department of Public Works, which also has charge of the sprinkling of the streets.

Fifty-three miles of streets are cleaned daily ; 187 miles of streets are cleaned three times a week ; 65 miles of streets are cleaned twice a week ; and 24 miles of streets are cleaned when

necessary. Besides the material collected by the Department there is also removed the material received at the dumping-boards upon permits issued by the Department to manufacturers and others, such material consisting mostly of "boiler" ashes and trade refuse; and, also, the refuse of the public markets, and material which the Department of Public Works desires to dispose of. The Department of Street Cleaning is also charged with the duty of providing for the disposition of all ashes, garbage, and rubbish that accumulates on steam-tugs, steamboats, and other vessels in the harbor. The Department is also required to remove snow and ice from the leading thoroughfares.

One of the principal obstacles encountered in the work of cleaning the streets is the bad pavements. This fact is well recognized by all thinking people, for it is indisputable that without good pavements you cannot have clean streets. No street, the pavement of which is not reasonably smooth and level, can be satisfactorily cleaned. The surface of no street can be kept reasonably smooth and level unless the pavement is well laid in the first place, kept in good repair, and protected from continual disturbance by excavations for the laying and repairing of subterranean conduits; nor can a street be kept clean which is used by its inhabitants as a general receptacle for rubbish.

And here I take leave to quote again from my report, on the impediments to street cleaning encountered in 1887 and 1888:

"The impediments were very numerous and of the most aggravating character. To those mentioned in the report of the work of 1886, and which continued in an undiminished degree in 1887, such as badly-paved streets, the want of proper receptacles for ashes and garbage, and innumerable street encumbrances of all kinds, there were added the more serious obstructions arising from the operations of various private corporations in laying down pipes, conduits, and other appliances, and making repairs to the various underground communications which they controlled. These corporations tore up the streets, dug trenches, threw the dirt carelessly on the carriage-ways, and piled paving-stones, lumber, and other construction material on them, in defiance of the ordinances and against

the protestations of the public. The extent of the evil created by the work of these corporations may be inferred from the following facts : 98 miles of gas-mains were laid ; 25.58 miles of trench opened for electrical subways ; 47.91 lineal miles of steam-pipes laid ; 37.90 miles of salt water-pipes laid ; 10,500 lineal feet of double-rail tracks laid ; 17,973 excavations made for house connections ; 15.42 miles of water-pipe laid ; 7.12 miles of sewers built, and many miles of excavations made for repairs of water-pipes and sewers, making ' a sum total so appalling as to furnish no analogy except in the results of a vast earthquake.' One can easily comprehend at a glance the difficulty of keeping the streets constantly in a presentable condition. I do not wish to be understood as being opposed to modern improvements. I presume all these openings of the pavements were necessary, and ultimately beneficial to the public. But the work should be done under the direction and inspection of public officers, and the pavements should be properly relaid and all the *débris* removed with the least possible inconvenience and annoyance to the public.

" The abuse of the streets was carried on to such intolerable dimensions that the Grand Jury made the suppression of it a matter of serious discussion, and even considered the advisability of indicting its promoters. The Academy of Medicine dissected the subject from a hygienic standpoint, and arrived at the conclusion that street excavations, to the extent that was then going on, during the summer months, were liable to lead to severe outbreaks of malarial and intestinal diseases. The Board of Aldermen and the Chamber of Commerce also agitated the question of securing reform. The latter body held a conference in December with the Mayor, when it was generally agreed that the first thing necessary was to give the Commissioner of Public Works complete power to relay the pavements when opened by private companies. But the needful legislation for such a proceeding was, I regret to say, not enacted, and all the agitation on the subject resulted merely in vigorous protests and denunciations, and it was only with the actual arrival of winter that the destruction of the pavements ceased."

The same observations apply with equal force to the condition of things to-day. Open and persistent defiance of public

sentiment and law, and abuse of granted privilege, has made many of the city thoroughfares worse than country turnpikes for travel. The streets through which the conduits of the several subway companies are laid have been and are continually torn up to repair the pipes ; and so much of this has been done lately that the pavements are full of ruts and holes, transforming the pavements into a system of traps dangerous not only to limb and life, but very injurious to all classes of wheeled vehicles, besides turning the avenues of traffic after a rain or snowstorm, wherever the depressions occur, into vile and filthy mudholes.

During my short visit to London, Paris, and other cities in Europe last summer, the fact which struck me most forcibly was the excellent and well-ordered condition of the pavements ; and the general conclusion that I was able to draw from close observations of the method of work, and the appliances in use, was, that where superior cleanliness was observable, as compared with the condition of the streets in New York, it was due not to better methods or better apparatus, but to the existence of better pavements, *the rigid enforcement of the municipal and sanitary ordinances relating to street cleaning*, the employment of at least double the amount of labor on the same mileage of streets, and the co-operation of the citizens with the officials in their task of securing and maintaining civic cleanliness.

I made the most of my time while in London and Paris. The fact did not escape my attention that there is a vast difference between our streets and those of London and Paris, particularly as to the condition by day and night. I like the way trucks and wagons not in use are kept out of sight, and then again no obstructions are permitted on the sidewalks. This fact enhances the pleasant aspect, and, from my point of view as Commissioner of the Street Cleaning Department, facilitates the work of the sweeping brigade. The systems pursued abroad are about the same as those adhered to in New York—that is, they use sweeping-machines and employ gangs of laborers and carts to pile up and remove the accumulations.

The streets of London are paved with granite, asphaltum, and wood. The principal thoroughfares, where there is heavy traffic, are laid with granite. Streets on which dwelling and

banking institutions are situated, and where there is light traffic, are paved with wood and asphaltum. Generally the pavements are in admirable condition in London and Paris. This is probably due to the care and skill in laying them. Few streets have steep gradients. All streets are first graded as near as possible to a level. The earth is packed by rolling and pounding. On this bed is placed a layer of concrete, varying from eight to twelve inches in thickness. When the concrete is properly levelled it is coated lightly with sand, just a cushion one quarter or one half an inch thick, for the pavement. The effect is invariably a remarkably even surface. Generally in granite block work, the spaces are filled with asphaltum. I noticed in certain sections that for asphaltum a thin grout of Portland cement had been substituted. This is a very good substitute. But for wooden-block pavement my preference is asphaltum, because it acts as a preserver. There is a marked difference between the regularity of the London and Paris streets and those here. We have so many depressions that cleaning is most difficult. It is my opinion that material improvement could be made in the condition of New York streets by judicious repairing. Where the paving-stones are good they should be taken up and relaid after the method common in London and Paris—that is, upon concrete foundations.

Next to the construction of streets in London and Paris, another point worthy of consideration by our authorities is the rule that the municipality alone can open the streets to get at underground pipes. As is well known when private corporations and individuals tamper with the pavement, the condition of the streets is not improved. Experts only should be permitted to lay pavements and repair them.

The sewer systems abroad interested me to no small degree, as good drainage has much to do with the condition of the streets, not to mention the public health. In London there are about two hundred and fifty miles of main and tributary sewers. There is a radical difference between the two European systems and that here. New York is peculiarly situated for effective drainage ; the island being between two large tidal rivers, the sewerage is washed away naturally twice in every twenty-four hours. There is no offensive sewage odor along the river fronts, and it is doubtful if a stranger could discover the sewer

outlets unless he sought them for a special purpose. In London the outlet sewers used to drain into the Thames River. So many nuisances were created that the sewage system was changed, and the drainage point is now miles below the city.

The streets and sewers of Paris are so near perfection, and the enforcement of all laws and ordinances relating to the streets is so thoroughly carried out, and the local pride of every Parisian to have the city's appearance superior to that of any other, is so great, that it is difficult to make comparison. In driving all around and through the city of Paris I did not see a single instance where ashes or garbage or house dust was thrown or swept into the street. The sewer system of Paris is probably nearer perfection than any inland system of sewers in the world. Its main sewer is as large as an ordinary railroad tunnel. The central portion of the bottom of the sewer, which might be termed a ditch ten or twelve feet in width and several feet in depth, is used to carry off the waste water and sewage of the city. On each side of this ditch or canal there is a footpath used by the laborers and mechanics in passing to and fro through the sewer to cleanse it, and to mend or improve the pipe system with which the arch of the sewer is covered. The water-pipes are on the side of the tunnel. Here also are the gas-pipes, the electric light cable, telegraph wires, pneumatic tubes, and a large pipe which was pointed out to me as a pipe for conveying compressed air from a station where they had several large compressors. This compressed air is distributed to all parts of the city to people who use compressed air for running machines and other purposes. When it is necessary to place an additional pipe or wire or cable, it is done right through the sewers wit hout annoyance to the public in any way.

The water-supply in Paris is excellent. The fountains are all flowing, and in the hotels I noticed that the pressure was very strong. In passing through the sewers the atmosphere was not very offensive, for the reason that it was so diluted from the amount of water that floweddfrom the fountains and from the gutters. The gutters in the principal streets are washed every morning by allowing the water to flow freely. This cleanses the gutters thoroughly, gives a bright appearance to the street, and dilutes the refuse in the sewers.

It is rather difficult to get at the cost of street cleaning and street pavements in London. We speak of the city of London in this country as a whole, but in London we find that street paving and street cleaning are done under the direction of, and paid for by, the local or parish boards. There are about forty parish or district boards in London.

The city of London, as they use the expression, is simply as we would understand it in New York, one of the wards of the city; but from the information which was given to me by persons in authority I am satisfied that they use about twice as many persons to clean the same area of streets as we do in New York, and that the amount of material removed from the streets is about half the quantity that we find upon our streets. This can be accounted for by the wasteful habits of our people, and on account of the coal that we use and the number of fires that are required in our dwelling-houses. The price of labor in London is less than one half what we pay in the city of New York.

There is one thing that I noticed both in London and in Paris, which confirms me in the opinion that I have had for several years—that is, that during the day we can use boys to assist in cleaning the streets to great advantage. A youngster fourteen or fifteen years of age is much quicker than a man to cross and re-cross streets, and pick up dirt on the streets, and of course their wages are in accordance with their age. In our city we clean the principal thoroughfares once in every twenty-four hours, generally; on the streets of heavy traffic at night time, on account of the crowded state of our main thoroughfares. We have not put boys on during the day, but from what I have seen on the other side I think they can be used to good advantage. Attention during the day would keep the streets in a cleanly and presentable condition the whole day, that is to say, that while under our system the street is very clean in the morning it is quite dirty in the afternoon when people are returning home, on account of the number of animals passing over it, and the heavy traffic during the business hours of the day.

There is one thing which, I think, contributes more than anything else to the cleanly condition of London and Paris—that is, the strict enforcement of all laws and ordinances per-

taining to clean streets. The following ordinance, which is rigidly enforced in London, gives an idea of the importance attached to throwing any dirt or refuse onto the street :

" Persons sweeping or throwing any refuse, dirt, ashes, dust, decayed fruit, or offensive matter of any kind, upon the foot or carriageway pavements are liable to a penalty not exceeding £5, and not less than 40*s*." Secondly, " Any person refusing to have the dust and ashes removed by the scavengers, or obstructing them in the performance of their duty, is liable to a penalty of not exceeding £5."

The records of the Board of Health give the following figures of population and death-rate in New York City since 1881, when the Department of Street Cleaning came into existence :

1881, population 1,242,533—death-rate, 31.08 ; 1882, population 1,279,560—death-rate, 29.64 ; 1883, population 1,317,691—death-rate, 25.81 ; 1884, population 1,356,958—death-rate, 25.82 ; 1885, population 1,397,395—death-rate, 25.53 ; 1886, population 1,439,637—death-rate, 25.96 ; 1887, population 1,481,920—death-rate, 26.27 ; 1888, population 1,526,081—death-rate, 26.23 ; 1889, population 1,571,558—death-rate, 23.00.

The population of New York City, as above given, is estimated by the Board of Health in this wise : The annual rate of increase between the State Census of 1875 and the Federal Census of 1880 is determined ; the same rate from year to year is used since 1880. The annual rate of increase is set down at about three per cent. But it is the popular belief founded upon the number of buildings erected since 1880, and the registration of voters, as well as the estimate furnished by the compilers of the City Directory, that our population is far in excess of the estimate of the Board of Health. One of our leading newspapers recently figured up a population of 1,688,433. Upon this basis our death-rate would be somewhat less than the official figures. Nevertheless, at the meeting of the Board of Health, held on the 16th of last month, the weekly report showed that the death-rate had reached a lower level than at any time since 1866, the rate being 18.80 per 1000 ; and the Board of Health felt justified in claiming that New

York might reasonably be classed among the healthiest cities in the world.

The press has done much to spread the knowledge of sanitary principles among the people, and to stimulate them into a more active and closer observance of the sanitary laws relating to the condition of the streets, by exposing our faults and failings, by chronicling successful examples of civic cleanliness elsewhere, by warning us of the dangers that attend negligence and disregard of the sanitary laws, by advising us as to the proper steps to take, and, finally, by encouraging invariably the advancement and prosecution of all measures calculated to promote civic cleanliness. The very important fact, however, should not be overlooked, that the Department has no power to enforce the ordinances.

In relation to the final disposition of ashes, garbage, and street dirt collected by the Department of Street Cleaning, various modes have been proposed from time to time for perfecting the appliances for the removal of all decomposing matter, and various agents have been suggested for use in connection with the removal of those accumulations of filth and dirt which are prejudicial to health and life. However, none have been submitted that fulfilled all the varied requirements of our city population, for effecting the speedy removal of the principal matter liable to decomposition, and the storage of which even for a brief period near our dwellings may be attended with serious consequences.

We dispose of nearly all our ashes and garbage by sending them to sea, and depositing them in deep water about three and one half miles off the Coney Island shore, and about six and one half miles S.S.E. of Coney Island Point. The dumping is begun invariably at the commencement of the ebb tide, and the tow of scows is kept running under easy headway off-shore while the dumping is going on; consequently, the material carried off-shore while the ebb tide continues—namely, from three to five hours, should reach the bottom before the return tide begins to flow, or, at least, should have gone beyond its influence.

An opinion prevailed at one time, in the minds of many persons, that the lower bay and some of the more important channels of the New York harbor were being filled up with city refuse. The groundlessness of this opinion is evidenced

by the report of Lieutenant-Colonel Gillespie, Corps of Engineers, United States Army, to the War Department last July, from which I make the following extract : " During the month of January, 1889, a survey of Gedney's and Bayside channels was completed, and the results were communicated to the public by a notice to mariners given to the press on January 25th. At that time, Gedney's Channel had a depth of 30 feet mean low water, between parallel lines 50 feet and 500 feet, respectively, south of the line of buoys G 2 and G 6 ; the Bayside Channel had a depth of 30 feet mean low water, between parallel lines 50 feet and 570 feet, respectively, south of the line of buoys B 2 and B 6. In the Main Ship Channel, west of Flynn's Knoll, the least depth between lines 100 feet and 500 feet, respectively, west of the line of buoys C 2 and C 6, was 27 feet at mean low water, where formerly 22.6 only low mean water existed. When it is remembered that before this improvement began, in 1885, the least depth in Gedney's Channel was 22.3 feet, in Bayside Channel, 24.3 feet, and in Main Ship Channel west of Flynn's Knoll, 22.3 feet, all at mean low water, the great results attained by the work of dredging will be quite apparent. The noticeable result is that there is now, June 30th, 1889, a navigable channel from the wharves at New York City to the sea, affording 30 feet depth approximately at mean low water, and 34.8 feet at mean high water, and that it is practicable for the largest steamer which enters this port to pass in and out over the bar in fair weather without regard to the tides."

I am convinced after full consideration of our system of disposition of the city refuse, that it is the most effectual and the most economical, and, from a sanitary standpoint, the best that can be used. There is no city in Europe or America that possesses such admirable facilities for the disposition of ashes, house-waste, and street-dirt as New York. Twenty-five miles of towage brings us to a point so far seaward that when the refuse is dumped that is absolutely the end of it ; but, notwithstanding these natural advantages, I have always been watchful of the measures in operation in Europe and at home for the final disposition of city refuse, with a view to adopting that system which would be applicable to our conditions and most advantageous for the public service.

The result obtained from the introduction of garbage destructors and carbonizers in Europe, and from such experiments as have been made in this country up to the present time, have been unsatisfactory, and have demonstrated the insufficiency of the existing inventions for the extensive work required to be done.

Under the most favorable circumstances the plan of cremation in Europe has not been a success from an economic standpoint. Throughout Great Britain and Ireland the cremation of the refuse material of cities is performed only to a limited extent. In the city of Bolton, England, population 106,000, there is one refuse destructor in operation. The cost of the destructor buildings, including site (an area of about three acres), was $110,000; and the quantity of refuse cremated is given at about 240 tons per week, or about 12,480 tons per annum, at an average cost of 20 cents per ton. In Leeds, population 323,000, there are two destructors and one vegetable carbonizer in use, cost (exclusive of site) about $60,000. The quantity cremated per week is about 490 tons, and per year, 25,000 tons, at an average cost of 38 cents per ton. In Bury, population 53,000, there is one destructor in use, cost about $17,000, cremating about 84 tons per week, and about 4400 tons per year, at a cost of 42 cents per ton. In Bradford, population 205,000, there are two destructors in use, cost about $46,000 (exclusive of site), cremating about 480 tons of refuse per week, and about 25,000 tons per year. In Manchester, population 420,000, two destructors and one vegetable carbonizer, cremating about 390 tons per week, and about 21,000 tons per annum.

The foregoing facts show that cremation is as yet an experiment, and that, notwithstanding that labor is so much cheaper than in New York, the cost of cremation per cart-load (a ton of English refuse being equivalent to our cart-load) is relatively greater than that incurred by our present method of disposing of the material.

The cost of final disposition of the refuse of New York City, on boats per cart-load during the past seven years has been: 1882, 20.53 cents; 1883, 19.37 cents; 1884, 17.77 cents; 1885, 17.44 cents; 1886, 17.44 cents; 1887, 17.16 cents; 1888, 18.00 cents.

I have shown that on the score of economy our method of final disposition, as compared with the process of cremation in vogue in certain cities in England, is far preferable. I believe that its superiority upon sanitary grounds can be demonstrated with equal facility.

Up to the present time, it may be said in a general way that all attempts to dispose of city refuse wholly by cremation, in England, have been little less than absolute failures. The successes achieved have been only partial, and the results attained so insignificant as to be utterly inconsiderable in relation to the magnitude of the work of final disposition in New York. And it would seem that the most that can be expected from cremation, for some time to come, is that of being an expensive auxiliary to other methods, which, so far as regards the English cities, their lack of the natural advantages possessed by New York City for the final disposition of its refuse, compels them to employ.

In addition to the English cities already mentioned, crematories have been operated in Warrington, Farnworth, Byker near Newcastle, Birmingham, and Richmond. It has not been apparent, as the result of the introduction of crematories, that the sanitary condition of the cities became so improved as to bring about a reduction of the death-rate ; and when, in the light of the latest reports, we compare the record in this city with those of the principal cities in England in which crematories are in use, the unprejudiced investigator must admit that New York, with its crowded population, in the proportion of nearly two to one per square mile, as compared with London, its tenement districts and its dilapidated pavements and other remarkable shortcomings, in a sanitary sense, is one of the most healthful cities in the world. For example, the death-rate in Bolton, with a population of 114,670, is 21.6 per 1000 ; in Leeds, population 357,449, the death-rate is 20.6 ; in Manchester, population 378,800, the death-rate is 26.1 ; while in this city, with a population estimated at 1,600,000, the average death-rate last year was 26.23 ; and the present death-rate is about 23.00 per 1000, which is the best showing for the past twenty years.

Since 1885, crematories have been erected in Pittsburg, Des Moines, Milwaukee, Detroit, Buffalo, Baltimore, Minneapolis,

and Montreal. The Bartlett, Rider, Engle, Mann, Murtz, Forrestall, and Glasgow systems have been severally experimented with in these cities, and while it was found that the utter extinction of the garbage was easily accomplished, yet it was also seen that the several systems were defective in the essentials of sanitary protection ; and the protests against their objectionable existence in some localities, led not only to the depopulation of the neighborhoods, but even assumed the form of violent demonstrations demanding the removal of the works. In Minneapolis, where the Engle system is operated, "it is still necessary," says the Commissioner of Health of that city, "to dump upon an average 300 loads of refuse and night-soil per diem into the river, and in the spring season the number of loads often increases up to 2500 a day." That is in a city of only 200,000 inhabitants.

I have been on the alert for the discovery of some system that would be more economical, more efficient, less objectionable, and more satisfactory upon sanitary grounds ; and although I have not availed myself of the power vested in me by law to purchase lands for the erection of crematories, and to take other measures looking to the disposition of the refuse by cremation, it has been for the reason that the efforts made everywhere up to the present time have been entirely insufficient for the work necessary to be done in New York City. But I have encouraged investigations and experiments by private enterprise, and without any cost to the city ; and, judging by the extensive improvements contemplated at the cremating works at Seventeenth Street and East River, there is good reason for expecting that the most satisfactory results possible will be attained, and that we shall soon possess a very valuable adjunct to our present system of disposing of the city refuse.

Now, what the public are most interested in, and anxious about, is to know what improvement can be made in our system of cleaning the streets, to have our streets equal, if not superior, to those of the large cities in Europe. My opinion might be condensed into a few lines :

1. Put the pavements in good order, and in putting down new pavements let us have the best that science can suggest. And when it is necessary to open the street pavement to lay

new pipes or repair old ones, have the work done under the supervision of the department or officer that is held responsible for the cleanliness of the streets. In replacing the pavement make the joint with asphaltum or cement-mortar; leave no dirt or sand on the street with the obsolete idea that it is the proper as well as the economical way of filling joints between the paving-stones.

2. Enforce the ordinances in relation to the condition of the streets. There is no necessity for additional ordinances; there are plenty now on the statute books. I refer, of course, to the ordinances in relation to clean sidewalks and streets. Ash and garbage receptacles should be kept inside of the areaway or railing, and exposed to view only at the hour that the ash collector comes, which should be as near the same time each day as possible.

The ash receptacle should be iron, and of a portable size. No empty ash receptacles should be allowed on the street or sidewalk after the ashman has made the collection.

3. When our water-supply will allow it, flood the gutters of the principal streets every morning, as the Parisians do. Then we will have attained a degree of civic cleanliness that will satisfy the most exacting.

GARBAGE AND REFUSE.*

ITS DESTRUCTION BY CREMATION AS APPLIED TO TOWNS AND CITIES.

By S. S. Kilvington, M.D., Health Commissioner of Minneapolis, Minn.

A year ago I enjoyed the opportunity of addressing this association upon the question of refuse destruction by fire. I outlined, at the same time, the history of cremation, and gave to this body a descriptive sketch of the several crematories manufactured in Great Britain, Canada, and the United States. This imperfect report having been embodied in the transactions of this association, where reference to the facts it recites

* Read at Meeting of American Public Health Association, Brooklyn, N. Y., October 24th, 1889.

can readily be had, I shall not weary you with any repetition of its descriptive data.

Moreover, I conceive that it is the function of the committee which I have the honor to represent, to discuss broadly the actual as well as the ideal methods now in vogue in the disposition of the refuse of our great cities.

By a strange fortuity the title bestowed upon this committee would seem to indicate that its duty was limited to a consideration of the question of garbage disposal alone. But such a disseverance of this minor topic from its natural and broader relations is as impossible as it is unwise. Our municipal authorities must meet and solve the problem of the disposition of their refuse materials, as a whole, for no system can be regarded as satisfactory in itself which necessarily demands the separation of one class of these waste materials from all other classes and leaves the large remainder unprovided for and undisposed of. While we shall all admit that these several forms of refuse must be recognized individually, and that all forms cannot be cared for or destroyed by a single process, yet a metropolitan sanitary system must include means for the economical disposition of all its waste products, and, where the cost of labor cuts so large a figure as it does in this country, it cannot afford to undertake the careful selection of garbage to the exclusion of everything else.

In the majority of our cities, this great problem of the disposal of waste matter is still practically unsolved, and that it is so is due, not to the absence of methods, not to the paucity of inventive skill, nor to a lack of ingenuity in devising means to this desirable end, but, in very large measures, to official indifference and popular ignorance of sanitary essentials.

Hoping I might be able to present to the association a digest of statistics which would have some practical value, the chairman of your committee issued, some weeks ago, a circular letter to the health officers of one hundred and seventy-five cities in the United States. The interest which it awakened may be measured by the fact that it elicited replies from but sixty-six. Of these, less than one third evidenced the possession of any statistics regarding the quantity of waste materials disposed of per annum. This letter also invited an expression of the views of each writer regarding the best method of disposing of refuse

materials, and the committee is glad to acknowledge very gratefully the efforts made by a few of its correspondents to meet the request. But how little appreciation of the pressing importance of such an inquiry exists, either in the professional or the public mind, is illustrated over and over again in the larger number of these replies. Health officials in cities ranging from 100,000 to 500,000 in population, remark that they "have not thought about it," that they "have no opinion on the subject," and that they "have had no experience and entertain no views," while, on the other hand, one unfortunate health officer, in a city of some 30,000 people, himself enthusiastic for sanitary reform, plaintively declares that, in his town, as in ancient Sodom, there "are not ten righteous" enough to manifest the least interest in health measures of any kind. But although these reports from our principal American cities are rich neither in figures nor in practical views, they offer abundant testimony to the fact that in the matter of waste disposal we are, for the most part, in a deplorable condition.

If we do not share the fate of the ancient cities of the plain, and are overtaken by no Nemesis in the way of regenerating fire and brimstone; if, like the Europe of the Middle Ages, we are not to be purified by the plague; if the cholera, in some of its periodic travels from its Indian home, does not find a foothold upon our shores, it is simply because we are endowed with a wealth of air, of soil, and of water, which permits us to violate, for a time, with seeming impunity, the laws of health.

But an end to this period of abused privilege is at hand. The characteristic feature of our economic development is the increasing concentration of people in cities, and it carries with it a menace to the public health. We can no longer leave to nature the chemistry of our waste products without danger to ourselves. She demands acreage per capita for her operations, where we can afford to give her a beggarly allowance of square feet. And yet to-day, in all but perhaps a dozen of our American cities, we are still taxing nature with this impossible task. Witness these reports, which include among them the cities of New York, Brooklyn, Philadelphia, Chicago, Milwaukee, Minneapolis, St. Paul, Detroit, Buffalo, Memphis, New

Orleans, San Francisco, Oakland, Cal., Manchester, Norfolk, San Antonio, Galveston, Cleveland, Dayton, Syracuse, Wilmington, Taunton, Providence, New Haven, Jersey City, Worcester, Denver, Savannah, Rochester, Springfield, New Bedford, Cambridge, Reading, Atlanta, Charleston, Pittsburg, Alleghany, Washington, Richmond, Bridgeport, Omaha, Kansas City, Louisville, Toledo, Chattanooga, Cincinnati, Nashville, St. Louis, Rock Island, Dubuque, Hamilton, Leavenworth, and Council Bluffs.

The refuse materials these cities have to dispose of come under seven heads: (1) ashes, (2) garbage, (3) offal, (4) dead animals, (5) manure, (6) night-soil, (7) sewage. What become of them? The first item, ashes, may be dismissed with the statement that this material is commonly and wisely employed in the making of roads, the levelling of alleys, and the filling of low lots. There is nothing objectionable in this practice, provided sufficient care is taken to keep the ashes free from animal and vegetable waste. It would be fortunate if all our refuse could be disposed of as easily and as harmlessly as this. The three succeeding items—garbage, offal, and dead animals—may be discussed in common, for they are usually subjected to similar treatment and are alike susceptible of the more superior methods of disposal.

We find that these materials have a widely variant destiny in different cities.

1. They are fed to domestic animals—notably to milch cows and swine; and one health officer assures us that the hog not only consumes but collects his diet at large, and that a "fine scavenger he is, and does it free of charge."

2. They are dumped into neighboring rivers, lakes, or ocean.

3. They are buried in many instances outside the city limits.

4. They are rendered either by ordinary soap and grease producers or by a process known as the "Merz System."

5. They are burned either in open fires or by means of some one or other of the several crematories now in use.

Animal manure usually goes with these other materials into the watercourses; it is sometimes buried, is seldom burned, and oftener is carried to the country districts and used for fertilizing in its raw form.

Night soil is occasionally composted and employed to enrich

the soil; is more commonly used to improve the water-supply; is once in a while destroyed by fire, and is quite generally buried upon a dumping-ground or left in privy vaults which are economically covered and replaced by new ones so soon as they are filled.

Sewage is carried into river, lake, or ocean, as the case may be, save in those rare instances, of which the city of Pullman, Ill., is a type, where it is disposed of upon sewage farms.

Now, what of the results? Comment upon the practice of feeding garbage, offal, and carrion to animals destined for use as human food is unnecessary. The hog may be as good a scavenger as the jackal or the dog of Asiatic communities, but he merely substitutes one nuisance with another, and should be regarded unclean in consequence by Christian as well as Jew.

The protest which should be uttered against the pollution of either river, lake, or ocean by the deposit therein of waste materials, must differ only in a degree proportioned to the character of the body of water and the domestic usage to which it is put.

The practice is undesirable at the best, and is intolerable, so far as river and lake is concerned, when either is the necessary source of water-supply to communities resident upon its shores. The extent to which this crying abuse is carried can only be remotely estimated by the few figures at command, but these are sufficient to call forth alarm and to emphasize the necessity for a radical reform. They are suggestive enough to warrant quotation.

In the Mississippi River, eight cities alone deposited during the past year 152,675 tons of garbage, manure, and offal, 108,250 tons of night soil, and 3675 dead animals.

Into the Ohio River, five cities alone dumped, within the same period, 46,700 tons of garbage and offal, 21,157 tons of night soil, and 5100 dead animals.

Into the Missouri River, four cities alone have cast, in the same twelvemonth, 36,110 tons of garbage, manure, and offal, 22,400 tons of night soil, and 31,160 dead animals. Recall the fact that a large proportion of these animals have been killed because they were suffering from glanders, farcy, hog-cholera, hydrophobia, pleuro-pneumonia, and tuberculosis,

multiply these figures by the lowest possible multiple, and add to this great mass of decomposing material some thousands of miles of sewage discharged into these three rivers, and the mind can form some dim conception of the degree of their pollution. No theory of the self-purification of running water will suffice to dwarf the magnitude of this sanitary crime. Happily, the United States Corps of Engineers has taken cognizance of this evil, in its recent reports to the Government, and it is to be hoped that the National authorities will, erelong, put a peremptory veto upon its continuance.

Like condemnation should be put upon the practice of the earth-burial of waste materials in large masses and in close proximity to our great cities. What shall be said of communities, ranging in population from 100,000 to 1,000,000, which boast the possession of fifty or one hundred acres of land just inside or outside their corporate limits, upon which they dump or bury, in closely planted shallow pits, thousands of tons of night-soil, garbage, offal, and dead animals? The human cemetery, fraught with peril to the purity of air and soil and water, and destined to endanger life and health as a spreading population hems it in, is innocent in comparison with this. And what sort of sanitary recompense is in store for cities whose officials confess to the filling in of low lots with the contents of their cesspools and privy-vaults, or to the habitual burying of these conveniences as they become filled? What is to be the future health history of a community whose building sites are honeycombed with these deposits?

But even while we view with consternation these crude attempts at the disposal of refuse, we greet with pleasure the evidences that a better time is coming in the sanitary management of these materials. Two methods remain which commend themselves to the student of this important theme, viz. :

1. The rapid decomposition of these waste products, by the speedy withdrawal of the water and gases they contain, with a view to converting them into profitable forms of fertilizer.

2. The rapid and complete combustion of these materials, with a view to their entire destruction.

The first of these methods has the advantages of intended economy. It is eminently proper that animal and vegetable waste matter should, if possible, be returned to the soil, of

which they constitute the natural and necessary nutriment. Animal manure and stable refuse may be safely conveyed, in their raw form, as it were, to farm or garden lands, provided the latter, in need of fertilization, exist within so short a distance from the limits of a city that the cost of the carriage of so bulky a fertilizer will not put it beyond the reach of the agriculturist. As a rule, however, he demands soiling materials in concentrated form, and the process and the apparatus that will produce these safely and cheaply is the hope of the future. Rendering works, have attempted to reach this result, and do reach it in a clumsy way ; but the remedy is commonly so much worse than the evil they seek to cure, that they cannot be tolerated within or near the limits of a city. A scientific piece of apparatus known as the "Merz System" has been devised and is—or is soon to be—in operation in three or four large cities in the United States. It treats only garbage, and one pointed objection to the system is the necessity for the separation of the former from other waste materials. It has to prove itself upon the ground alike of economy and sanitary safety before it can be accepted as a satisfactory solution of even this part of our problem. Like all other apparatus, much of its success must depend upon the care and intelligence that are bestowed upon it in its daily operation. Unquestionably, it is possible to apply scientific and sanitary principles to the rendering of animal fats, vegetable oils, and residuous fertilizers, but they must be applied in such a way that the product will be marketable, wholesome, and easy of transportation. And, even after these substances have thus been dealt with, we have a wealth of material on our hands in the way of dead animals, night-soil, and sewage which must soon be forbidden deposit in our watercourses and great lakes, and which has an even more noxious quality and an even higher fertilizing value than the garbage and dead animals with which the "Merz System" proposes to deal. With these concentrated soiling materials at hand demanding some disposal, is it, after all, worth while to extract the comparatively scanty fertilizing residuum which remains after the rendering of carrion and vegetable waste? Is it not better and cheaper and safer to destroy at once, by cremation, these readily combustible materials, together with stable refuse, and

to apply ourselves most assiduously to the problem of deodorizing, diluting, and safely transporting to the soil the sewage and night-soil with which every large community is so injuriously burdened. So high a percentage of fertilizing value per volume do these materials possess, that they promise a revenue which will repay the cost of preparation and safe carriage. But a small bulk of such a fertilizer, in convenient form for handling and distribution, would be required by the gardener or farmer to fructify his lands, in comparison with the amount of the solid fertilizing residuum of animal and vegetable matter, in the gross, which he would need.

In the mean time, the crematory, under several patents, has proved itself to be a practical success in many places. The Engle, the Rider, the Patrick, and the Mann furnaces are actively in use in several cities. Out of thirty-five health officials, who have favored me with a reply to my request for an expression of opinion upon the disposal of garbage and other refuse matter, twenty-three indorse the practice of cremation. Says Dr. Salmon, of the Louisiana Board : " Cremation I believe to be the best, safest, and only sanitary method of garbage disposal."

Dr. Bidwell, of Leavenworth, says : " I am decidedly in favor of cremation as the best method of disposing of waste materials."

" There is only one scientific and practical way of disposing of garbage, and that is by cremation," says Dr. Trebel, of Hamilton, O. " Every city of 20,000 people should have a crematory," he adds.

" I am of the opinion," remarks Dr. Dudley, of St. Louis, " that cremation is generally the best method."

Dr. Ewing, of New York, replies : " There is no doubt in my mind that the best method of disposal is by cremation."

" I am in favor of burning," says Dr. Martin, of Chattanooga.

Thus is public sentiment manifesting itself throughout the country.

To begin with first principles, I would educate the people, if possible, up to an appreciation of the advantages of this method. The household cremation of animal and vegetable waste is a sanitary and an economic possibility. The ordinary

kitchen range or the house furnace is a good incinerator. If the habit of banking up table refuse to dry upon one side of the stove or heater fire be adopted, it will be found that this material, freed of its excess of moisture, is an excellent form of fuel in itself. This complete destruction of household waste does away with all necessity for its accumulation and removal. The owners of markets and commission houses, restaurants and hotels would find it equally profitable to provide themselves with small private crematories for the destruction of refuse. Such a device, easy to operate, economic in its cost of support, and sanitary in its results, can be readily obtained. And as for municipal needs, which, after all private effort may do, will still remain in large measure, I have found no reason, in the past year, to change my belief that cremation is, if not a perfect process, at least the most desirable method for the disposal of the greater part of a city's refuse.

A somewhat varied and difficult experience in the attempt to educate the public in this faith has taught me that, in order to its best success, a crematory must be carefully constructed after a chosen model, and should be continuously operated. So built and so conducted, I believe it will most safely and economically dispose of all the coarser and combustible kinds of waste material. My own choice has fallen upon the Engle Patent as being, with certain modifications, the most promising in its results. Its essential feature, without which, in some form, a crematory cannot be a sanitary success, is the provision of a second fire intended for the destruction of the noxious gases and vapors which inevitably escape the primary fire. Models of this and other patent furnaces are on exhibition to members of the association, and will deserve your scrutiny. In New York, at the foot of East Sixteenth Street, East River, built for the Board of Health, the Engle Crematory may be seen in practical operation and will speak for itself; to those who have not investigated the merits of the system, the trip to that point would be a very profitable one.

To return to our general theme: Among the hopeful indications of sanitary reform, the effort being made in several of our large cities toward the abolition of the privy-vault system is deserving of especial mention. Such a step will utimately

simplify the problem of waste disposal in the matter of one of its most important factors.

New York is, I believe, the only city where this reform measure is an accomplished fact, but other communities are following in its wake. Where sewerage does not exist, decided preference should be given to the well-constructed earth closets ; where the sewer is available, connections should be ordered as rapidly as possible. Minneapolis is, I am happy to say, now taking her initial steps in this direction.

The most important bar to the progress of the health measures we have discussed lies in the torpor of public sentiment, and it should be the highest function of this association to stimulate the education of the people in these interests. We have relied too long and too implicitly upon our natural advantages, to the neglect of those precautions which would tend to preserve them.

In this respect, European cities are in advance of us, for while their natural conditions are inferior, they have learned to enhance them by artificial means. Modern London, Glasgow, Edinburgh, Paris, Berlin, and Naples are object lessons to us of a past which points with warning finger to our future, and a present which sets for us the example of timely and efficient reform.

The American people are slow to learn the worth of improvements which cannot be estimated by commercial standards, and yet, in these days, it is undoubtedly true that health is an indispensable commodity, and that length of days and long life have an economic as well as an ethical view.

HUMAN EFFLUVIUM from the *living* human body, inhaled or ingested, is a well-recognized cause of disease by all intelligent observers. That it is not at the least equally so from the dead body, especially when it is putrescent, is difficult to believe.

The following, taken from " Johnson on Tropical Climates" (American edition, p. 83), is an illustrative case.

" An American merchant ship was lying at anchor in Wampoa Roads, sixteen miles from Canton. One of the crew died of dysentery. He was taken on shore to be buried. No dis-

ease of any kind had occurred in the ship from her departure from America till her arrival in the river Tigris. Four men accompanied the corpse, and two of them began to dig the grave. Unfortunately they pitched upon a spot where a human body had been buried about two or three months previously (as was afterward ascertained). The instant the spade went through the lid of the coffin a most dreadful effluvium issued forth, and the two men fell down nearly lifeless. It was with the greatest difficulty their companions could approach near enough to drag them from the spot and fill up the place with earth. The two men now recovered a little, and with assistance reached the boat and returned on board." Both died, one on the evening of the fourth and the other the morning of the fifth day of a malignant fever, with symptoms resembling plague. The other two men, who were less exposed, were similarly affected, but recovered.

That the poisonous emanations inhaled in this case would have been any less dangerous if swallowed with the subsoil water in the vicinity can be surmised by those only who believe inhumation of the dead to be without danger to the living.—EDITOR.

THE DRAINAGE OF NEW YORK CITY.

A COMPLETE examination of the drainage system of this city has recently been made by Mr. Rudolph Hering, and a report on the same submitted by him to Commissioner of Public Works Gilroy.

A part of the report is historical, beginning with a description of the first attempt in 1676 to drain from the low areas of the island the accumulation of storm water. In 1865 the Legislature authorized the city to adopt a general system of drainage, which extended over only those localities not already sewered. At that time there were about two hundred miles of sewers and twenty-five hundred catch-basins. In 1870 the Department of Public Works was given control of the sewers, from which date many improvements have been made.

The earlier sewers were built each for its special locality, without regard to other parts of the city, so that there are really many separate systems. Most of the sewage is dis-

charged into the docks, and considerable trouble is caused by the precipitation of heavy matter. Other difficulties are insufficient size of the old sewers, their present dilapidated condition and bad junctions, the latter retarding the flow in the main sewers ; and the great quantities of refuse of all descriptions that find their way into the sewers.

In his examination Mr. Hering made some interesting and valuable experiments regarding the minimum and maximum velocity of the flow in the sewers, and also regarding the relation of the rainfall to the flow. He found that with proper construction and attention the minimum flow might generally be made to have a velocity sufficient to prevent deposit, as the grade is, in most cases, ample for this purpose. The outfall sewers present very low grades and demand special attention.

On an area of two hundred and twenty-one acres, comprised in one district, the average time in which the water from the extremes reached the sewers was from eight to ten minutes, when the sewers were half full. The estimated average time in which water falling upon roofs and gutters reached the sewers was from six to eight minutes.

Several rain-gauges were placed upon the roofs of buildings in the above district, and during the period the greatest discharge was 1.17 cubic feet per second per acre. The greater the intensity of the rain for a short space of time, the less was the percentage which reached the sewer at its maximum flow.

As the intensity of the rainfall varies almost continually, a heavy uniform fall, rarely lasting over ten minutes, self-recording gauges were used to determine the maximum fall the sewers should be able to receive. The highest records were three inches in one hour, two inches in thirty minutes, and one inch in ten minutes. In England allowances have been made for a rainfall of one inch an hour, while in Paris the assumption is that a maximum of 1.77 inches falls in one hour, and one third of this amount reaches the sewers during their maximum flow. The allowance in Berlin is for one-third inch per hour to reach the sewers at one time, and at Vienna one-half inch per hour is supposed to fill them. Coming to this country, in New York, in 1868, it was estimated that from a rainfall of one inch per hour, seventy-eight per cent of the average fall reached the sewer each second on areas of five acres, and

that the quantity gradually diminished, till on an area of three hundred acres it would be but twenty per cent. In Philadelphia the sewers are proportioned to receive from all areas an amount of water equal to a rainfall of one inch per acre per hour. In Providence the assumption is that from fifty to eighty per cent of the maximum rainfall reaches the sewers each second.

A list of sewers within the city that are in improper condition covers seven type-written pages, and includes such causes as general dilapidation, and the entrance of steam and objectionable manufacturing refuse. Mr. Hering thinks that by remodelling these imperfect sewers the system can gradually be brought to a high standard of perfection. —*Eng. News.*

SOMETHING ABOUT COTTON.—The amount grown in the United States in 1888–89 is said by Hon. J. R. Dodge, Government Statistician, will not vary greatly from that of the present crop. The report to November makes the crop of 1889 3 per cent larger yield and 2 $\frac{34}{100}$ per cent more acreage than the last crop, which makes its estimate for this crop 7,345,000 bales against 6,938,290 for last year, which shows an increase of 406,710 bales.

"It is estimated by the best authorities," says the *Memphis Appeal*, "that the world will need this year 7,250,000 bales American, 1,500,000 bales India and 750,000 Egyptian, etc. In this connection we will state that there has been no increase in the crops of India or Egypt in many years, and that the average crop of India is about 1,500,000 per year, and about 500,000 bales is an average crop for Egypt. Some other countries make a little cotton, which they consume at home, and is not counted in the world's supply. From the foregoing figures it will be seen that all the cotton produced this year will be needed, but there will be no scarcity if the bureau is correct."

All the cotton grown in the world last year was consumed by the following named countries :

Great Britain, 3,126,480 bales ; Continental Europe, 3,182,400 ; America, 2,448,000 ; India, 680,000. These bales are made to contain 500 pounds each, and on that account show fewer than was actually "put up ;" but every pound is counted.

THE PARAMOUNT IMPORTANCE OF LEGISLATION FOR THE APPLICATION OF SANITARY SCIENCE.

AN ADDRESS TO THE CITIZENS OF THE UNITED STATES AND CANADA.

By Sir Edwin Chadwick, C.B.

[This paper has been in hand for nearly a year, but has been held back for timely publication.—Editor.]

I am apprehensive that the example of what has been done by the earnest application of the principle of "Circulation *versus* Stagnation," and the reduction of the death-rate to eight in a thousand at Pullman, though corroborated in numerous instances by what has been done at home, must be set down for general application to a far distant future; but we have specially noteworthy examples at home—of Old Salisbury, which had once a death-rate of 40 in a thousand of the population, since, by sanitation, reduced to an average of 16; of Portsmouth, once 24, now 15; of Croydon, once 24, now 15; of Rugby, once 24, now 12; of Buxton, a health resort, once 18, now 9. With these reductions of death-rates there is to be considered the augmentation of the mean duration of life, as, for one example, in Leek, an urban manufacturing district, where it has been estimated that between the years 1860 and 1887, the augmentation of the mean duration of life to all of the population has been seven years. It may be noted that to every female sanitation gives the like extension of the duration of increased health of life and of beauty. I believe it will be found that the estimate of the reduction of the general death-rate of the State and of the city of New York by ten in a thousand by complete sanitation will be justified. Death-rates of the general population are liable to various objections, but the death-rates of children under five years of age may be taken as the most trustworthy, as they are the most affected

by the conditions of the air, and are the least affected by occupations, and migration or emigration. Well, the proportion per cent of the deaths of children under five years to the total deaths is in the city of New York no less than 43 per cent, and in the State of New York, 36 per cent. With the classes in a good sanitary condition at home the proportion is about 10 per cent. From what I have shown to have been done for the prevention of the "children's diseases" in the infantile stages of life, and what has been done in New York in the juvenile stages, there will be found full justification of the estimate of a reduction in the general death-rate of ten in a thousand by sanitation in the United States, and, it may be added, in the Colonies.

It should be borne in mind, that the several examples of the practical applications of sanitary science are yet below the further advances to be made by the adoption of Maxim's great invention for ventilating schools and workshops with air that is warmed in winter and cooled in summer; and by the methods of cheap washing with tepid water—which are below what is yet to be done for the prevention of overcrowding in single rooms, and also below what is yet to be done for the prevention of the spread of disease, by the regular inspection of schools and workshops by officers of health.

Now, what does the excess of deaths, estimated at ten per thousand of the population, amount to? For the city of New York it amounts to an annual loss of 12,063 lives on its population in 1880, and in money, at Dr. Farr's estimate, £1,918,017.

Dr. Farr's estimate of the value of life has been objected to as excessive, but if the lowest cost of maintenance for thirty years (the mean duration of life of the wage classes—man, woman, and child) in a public institution be estimated, it will be found to be more than double that of Dr. Farr.

For the State of New York the annual loss in lives is 50,829; in money, £8,081,811.

The annual gain by the reduction through sanitation of a rate of ten per thousand in the death-rate on the whole of the population of the United States, now estimated at sixty-four millions, would be in number of lives 640,000 annually, and in money, at £159 per life, £101,760,000.

In a paper read before the Medical Society of Pennsylvania, Philadelphia, in June last, by Dr. Traill Green,* that gentleman showed the general ignorance prevalent in the States, as indeed in this country, of the simplest principles of sanitation ; of the people shutting themselves up in foul air ; of their confining themselves amid the conditions of putrefaction ; and of living with unwashed, filthy skins ; of architects, and, it may be added, of engineers, equally ignorant of sanitary principles, acting by the wastefuless of ignorance in excessively expensive, ineffective works. Above these are the party politicians, equally ignorant, and by their inferior subject-matters of contestation, darkening knowledge, and setting aside subject-matters of paramount importance to the economy, health, and well being of the population. I append some extracts from Dr. Traill Green's address.

The number of troops killed and wounded in the Civil War in America was 619,196, but here we have 640,000 lives lost annually, or a greater number than was lost during the whole four years of that dreadfully fatal struggle.

I have shown elsewhere, by one sanitary-factor alone—that of land drainage in Scotland—that ague has been almost abolished. Ague was once so prevalent that when a piece of work had to be executed, a farmer would engage six laborers instead of four, on the probability that, before the work was done, some would be disabled by an attack of the febrile disorder. In Lincolnshire the comparative banishment of ague by the drainage works undertaken there with steam power is denoted by the medical use of ounces of bark where pounds were used formerly. The chief factors of sanitation are now so far certain that a capitalist might undertake to contract for the attainment of results ; and I have recommended that local authorities should inform themselves as to the cost of sanitary work, thus inviting the competition of plans for the reduction of death-rates. I have confidence in the superior inventive power in the United States that would be evinced in sanitary works of superior efficiency and economy. As has been said of Greece, it may be said of the Anglo-Saxons in the United States, "that the number of individual intellects, indepen-

* The Sanitarian, Vol. XXI., p. 133.

dent, inquisitive, and acute, is always rare everywhere," but it is comparatively less rare there than in most places elsewhere. As examples of this may be presented, the land drainage and subsoil irrigation effected by Mr. Hamilton in Colorado, which, it is proved, saves half the average loss of life by phthisis ; also the excellent works already mentioned at Pullman, and the drainage of villages and the application of sewage by Colonel Waring, C.E., of Newport, R. I., and his advanced hydraulic machinery for self-cleansing drains and sewers, besides the great example of reductions of the death-rates of children, which I have mentioned as effected by the Children's Aid Society, under Mr. Brace, of New York. To these examples of advancing sanitation may be added the reductions of soot and the purification of the air of cities by the economical distribution of warmth and power for houses from common centres and institutions. In Manchester, offers have been made for the working of steam-engines by gas at two thirds of the cost of working them by steam, and thus abolishing the smoke nuisance. This has not been yet accomplished there, but the practicability of the abolition of the smoke nuisance in existing cities as well, is proved to be attainable with large economy. It has, moreover, been practically accomplished at Pittsburg. If the political "outs" were not ignorant, as mere political parties now are, they might usefully assail the "ins" for such wastefulness of ignorance, like that of political parties in England, not only for dire losses of life by these defaults, by the great wastefulness of throwing the sustenance of some one hundred thousand cows into the sea, to the injuries of the fisheries there. One party political candidate appears to have proposed the annexation of Canada to the United States. This, when examined, would be found to be the annexation of ignorance to greater ignorance and habits of political corruption, at an expense to Canada of the continued loss of more than forty-three thousand lives annually, and of nearly seven millions of money, and, moreover, to the exclusion of the Canadians from the free citizenship of a confederated Anglo-Saxon Empire, sixfold greater even than that of the United States, and even more progressive economically and politically than that to which the Anglo-Saxons of the United States are now confined, and obstructed socially, as

well as excluded politically, and made aliens from all by their political separation from the mother country !

I have already referred to an important address on Hygiene by Dr. Traill Green, of Easton, Pa. In the course of this address he asks, " What, for example, do we find to be the practice of our people (and I do not refer to the lower classes only) with reference to the importance of pure air in our dwellings ?" Many remain during winter, by day in rooms which are not ventilated, and by night they sleep in apartments into which no pure air is admitted, while the occupants are consuming the air which the rooms contained when they retired for the night. Is there not a very general belief that night air is in some way exceedingly injurious, and therefore must be carefully excluded ? Do they not know that it is not only air to be had after sunset, and must be used, or respiration cease ? As regards ventilation, many architects and builders must be very ignorant, or they plan and build in accordance with the ignorance of those who are to occupy the houses which they arrange for them. Not long ago I examined a house that was erected by a wealthy gentleman, who was about to occupy it. I examined it that I might learn how far it had been constructed with reference to the health of those who were to make it their home—to spend most of their time within its walls. It is a large double house, and apparently properly built. I was particularly interested to learn whether the architect had made provision for ventilation ; not a flue or register could I find in any room in the house. I met the mason who had been employed to do the mason work. I remarked to him, " That building which you and the carpenter put up is very like a merchant's packing box, and does not meet the ideal of a properly-constructed modern house. I could not find any arrangement for ventilation." The mason replied, " There are flues for all rooms in the house." I said, " I could not find them." " No," he replied, " we plastered all of them up." The carpenter who built the house, with the principal builder in the town, said, " I had occasion to direct the construction of an addition to a parsonage some years ago. I employed a man who possessed an excellent trait of character, which was that he could do what he was directed to do." The same carpenter to whom I have referred went to examine

the work, and asked this man what he was doing. He replied, "I am building a flue as the doctor directed." "Well," said the carpenter, "the work was completed according to the plan," and the family occupied the house, where the air was pure, helpful to recovery, and pleasant to the nurse.

Not long ago a man applied for admission to one of the hospitals of this city. He was examined, and a physician in charge called one of the assistants to take him to the bathing-room and give him a bath. The man objected, and said, "I bathe twice a year and not oftener; I bathed myself a short time ago, and will not be bathed now. I would rather have my disease." The physician would not recall his order, and the man left the hospital. I have been surprised, when attending sick children, and having prescribed a warm bath, often so soothing and so remedial in many of the diseases of children, to hear mothers say, "Doctor, I could not use it; my child will be so frightened that I would fear for the result. I never gave it a bath."

As an example of governmental ignorance of sanitation in the United States, I may remark that the prisons in England are now declared to have been made the healthiest places in the world. In some parts of America the prisons are shown to be yet in the condition displayed in a report recently issued of the examination of the Montcalm County Jail at Stanton, Mich. It was found that the present system of drainage consists of a sewer laid upon the ground beneath the basement floor, by which the sewage is conveyed to a cesspool in the rear of the building. The sewer is constructed of tiles closely laid together with little or no cement. Many of the tiles have been broken and have not been repaired. The poor construction of the sewer has led to frequent stoppages between the closets and the cesspools at points under the building difficult of access. To relieve these obstructions when they occur a man crawls under the building upon his hands and knees and breaks a hole in the pipes at different points until the pent-up sewage gushes out upon the ground, and the obstructing matter is removed. Many such holes have been made, and instead of being repaired have been loosely covered or stopped with bricks. As the result of these frequent openings, a large amount of decomposing sewage has accumulated upon the

ground under the jail. The exact amount is not known, but the sheriff estimated it to be several wagon loads. . . . A prisoner who was suffering with diphtheria had been in prison a month, and most likely contracted his disease while in prison. Certainly the conditions for producing a spontaneous outbreak of diphtheria could scarcely be excelled."

In a paper read before the Section of State Medicine at the Annual Meeting of the American Medical Association, by Dr. T. B. Greenley, of West Point, Ky., that gentleman gives the due place, as I consider, to the important statistics of the death-rate of children under five years of age. He says, "Of all children who die under five years old, 61.41 per cent die before they are one year old. This is a shocking fact that should strike every thinking medical mind, and cause the sanitarian to be diligent in the use of every means possible to mitigate such a dire calamity. I have grouped the mortality reports of childhood in six Northern States—to wit: Maine, Massachusetts, Michigan, Minnesota, Nebraska, and New Hampshire, which show a mortality of 57.30 per cent of those who die under five years of age. In the States of Mississippi, Louisiana, Kentucky, South Carolina, Tennessee, and North Carolina, the percentage of mortality is 56. These statistics do not embrace the large cities of those States, the mortality of which goes to increase the general death-rate. In grouping the cities of Boston, Cambridge, Fall River, Lawrence, Lowell, Lynn, New Haven, and Providence, we have a mortality of 62.37 per cent, while the combined mortality of Charleston and New Orleans amounts to 70 per cent of all the children who die before the age of five years."

Dr. Cyrus Edson, of New York, has stated that the water-supply of the summer health resorts in this country is almost as miserably bad as can be. The most attractive watering-place is often but a dangerous guest trap, baited with alluring scenery, fresh air, fishing, boating, and other things attractive to its game of gathering the young and old, that it may wreak its ills upon them. During the months of June and July I visited eight popular resorts; all were on the sea-coast, and were situated in villages, or consisted of congregations of cottages. All were supplied from dug or driven wells, in depth about twenty feet. The drainage was uncared for as far as prevent-

ing contamination of the wells was concerned. At one place, the only one where a sojourn of ten days was made, nearly all the guests were found suffering from diarrhœa of more or less severity. "The unacclimated, or rather the unacquainted visitor from the city, after a few days in such a place, wonders what ails his bowels."

LIGHTING AND WARMING.*

By Professor Robert Spice, of Brooklyn.

All illumination by artificial means is by making certain solids, either particles or masses, incandescent by heat, directly or indirectly. (This was illustrated by several experiments which showed that the light of gas and other flames is due to particles of carbon at a high temperature, but in the solid state. Reference was made to some late researches on this point, which proved that the particles *do* exist in the flame, for when a sunbeam is thrown on a flame and the *reflected* light from the flame is examined, it is found to be partly polarized. This proves the presence of solid particles. The Welsbach Incandescent Burner was shown, and a French Platinum Gauze Petroleum lamp exhibited.)

From a sanitary point of view, he said, we have to consider two things—namely, the effect of lighting on the temperature of a room, and the chemical effect on the condition or composition of the air.

The temperature side is disposed of by one statement, on the authority of Mr. T. A. Edison, that the heating effect, when gas is the source of light, is from fifteen to twenty-five times greater than when Incandescent Electric Lighting is employed.

Chemically, when any combustible used for illuminating purposes is burned, the products of combustion are watery vapor and carbonic acid gas.

* Abstract of Lecture on the "Promotion of Health," at the Brooklyn Institute, in connection with the Brooklyn Health Exhibition, October 22d, 1889.

The first is rather desirable, but the second is decidedly injurious. (And here experiments were made showing that the products of combustion were as stated, and others showing the presence of carbonic acid in the air of the room.)

The amount of carbonic acid in country air is four parts (by volume) in ten thousand of air.

(Dr. E. H. Bartley's method of measuring the amount of carbonic acid in air was explained and exhibited, and the advantage of the doctor's method pointed out.)

He showed by experiment that the breath contained a large amount of carbonic acid—an average of about three hundred and fifty parts in ten thousand.

A comparison was made of lighting by gas and by incandescent electric method, with reference to carbonic acid ; first noting the fact that one sixteen-candle gas flame produces as much carbonic acid as eight men. (Angus Smith.) The following figures were obtained by Von Pettenkofer in the Imperial Theatre at Munich :

Light by Gas :	Parquet,	after 30 minutes,	5 in 10,000.
	First Balcony,	" " "	11 " "
	Third "	" " "	20 " "
Light by Electricity :	Parquet,	" " "	5 " "
	First Balcony,	" " "	5 " "
	Third "	" " "	6 " "

NOTE.—Seven in 10,000 is objectionable.

Reference was made to the fact that the organic matter in expired breath was highly injurious, and that it was produced pro rata with the carbonic acid—*i.e.*, when the carbonic acid was doubled in quantity so was the organic matter, and consequently chemists determined the amount of carbonic acid, and thus obtained the relative amount of organic matter. In other words, in those cases where the amount of carbonic acid in the air (*over* volumes in ten thousand) is due entirely to respiration, then this added amount is the quantitative index of the organic matter from the lungs.

Warming was briefly considered, and the question of heating by gas discussed.

At present the cost of heating by gas is prohibitory for *continuous* heating, as the following figures show :

Heating by gas : A room 14 × 14 × 8 feet would require a stove burning $5\frac{37}{100}$ cubic feet per hour, as an average of

different weathers at different times of year. At $1.60 per 1000 cubic feet, this equals $\frac{86}{100}$ cent per hour.

Heating by coal—from observation : Ten tons coal used in one year @ $5.50 = $55. Number of rooms heated, twelve.

Taking nine months (June, July, and August) *out* = 6576 hours, $\frac{83}{100}$ cent per hour for twelve rooms.

Thus, in round numbers, *continuous* heating by gas costs twelve times as much as heating by coal.

With reference to cooking by gas, experience has shown that the cost is from thirty to thirty-five per cent *less* than in cooking by coal, the reason being that less fuel is required to heat the ovens, and that when the cooking is finished the expense stops at once by shutting off the gas.

The advantages of heating by gas are : First. Heat is obtained in much less time than when using coal.

Second. Ability to control the heat exactly. This is of great importance in the sick-room.

Third. Absence of dust and dirt of various kinds.

Fourth. No lifting of coal to stoves or taking away ashes from them.

Points third and fourth obviously mean much saving of labor and reduction of wear and tear of furniture, etc.

In speaking of gas stoves in general, he pointed out that for economy the gas should be completely burned, non-luminous flame ; and further, that the greatest heating effect was from convection, *not* radiation, though incandescent stoves looked cheerful ; and lastly, that full provision should be made for taking away the products of combustion.

THE LONGEVITY OF THE JEWS," says Dr. Hasmes, " has long been demonstrated by statistics. In Prussia, the cradle of Judaism, there are three still-born Christians to one Jew ; the Christian mortality is 23 per cent, Jewish, 15 per cent ; from one to five years, 36 per cent of Christians die against 25 per cent of Jews ; and at Furth the average duration of life is twenty-six years among the Christians and thirty-seven among the Jews. Hence, the Jew is a better subject for assurance, which, by the way, he perfectly understands, and takes for heavy sums."—*L'Avenir Economique.*

THE NEAR FUTURE OF ELECTRICITY.

By George Cutler.

We, who are unfortunate enough to have less than half of our probable time of life to look ahead to, are greatly pleased with the rapidity of electrical development, as it assures us the probability of seeing many of the wonderful advances to be made in the growth of the science, pure and applied. But we realize that the inventions and discoveries of the near future are likely to be closely allied to the accomplishments of the present. The development of new fields is to be left to succeeding generations. We can hardly hope to see the successful production of electricity in large quantities for commercial use, direct from crude material, instead of the present expensive method of passing our energy through the boiler and steam-engine. The full understanding of the production of light by the firefly and the applications in that direction are certainly too far ahead to afford us a ray of hope of anything more than an imaginary picture of what will be done.

We may imagine that cities will be lit by some luminous compounds on the walls which will give out the light at night that they absorbed in the daytime, but in this we are letting our imaginations loose and getting so far away from the practical work of the present, that the time so spent must be charged to recreation and pleasure account; whereas the time spent in forming mental pictures of the widest possible developments in directions at present pursued may prove very valuable. Our best inventions and discoveries are made by such use of the imagination.

The superiority of the electric light for certain purposes is well understood, and the great problem is to furnish it to all without stint or preference. The immediate demand in our large cities is for installations of hundreds of thousands of horse-power instead of those of a few thousand horse-power merely. As Americans it does not behoove us to ask the authorities to pass laws which will limit our work to that partic-

ular system that we have partially developed. The expression, "We can't," should not exist in the American electrician's vocabulary, as it should always be supplanted by the question, "How can we?"

If all sorts of wires are run in all sorts of ways, except the correct ones, about the city of New York, and then an over-zealous authority takes steps that prevent the different lighting companies from keeping the heterogeneous mixture of wires in half-way decent working order, resulting in the death of several employés in quick succession, we do not need to assume at once that certain systems *cannot* be safely distributed. A careful, candid study of the situation, to trace the cause of the accidents with a view to remedy the evil, is much more to our credit. The very small number of such accidents in the whole world during the existence of these necessarily fatal systems certainly indicates that the problem is comparatively simple. By using high-class insulated wires, such as are already largely in use, and by planning circuits so as to prevent such a snarl as now exists in New York, the danger can be almost entirely removed. Some accidents are bound to happen, just the same as in other industries in our crowded cities.

Because fifteen people "persisted in absent-mindedly blowing out the gas" in the city of Chicago in the year 1888, we do not strive to pass a law preventing the use of this dangerous mixture. Fortunately, the scare-crow articles of a few interested individuals cannot block our industries in this country, and we may, therefore, look forward to the establishment in the near future of large installations for the distribution of energy by electricity. Why should we not have an installation in Chicago of two or three million lamps instead of thirty or forty thousand? It is sure to come. The electric light is needed in all the offices, stores, residences, etc., in the city, and they are going to have it. We need not hope to get it by a system that would necessitate an expensive station every half mile; therefore we must look for some means of distributing at great distances. This necessitates high pressures in the distributing wires, and some means of conversion which will reduce this pressure for the inside wires. The conversion by accumulators is being developed persistently, and it is hoped successfully, because they add to the property of chang-

ing the pressure the other great advantage of storing the energy until wanted.

The conversion of high-pressure continuous current to low-pressure currents by means of "direct current" or "dynamo converters" is also being developed, and let us hope that the "Wizard" of Menlo Park will succeed to fulfil his promises in this direction, so that we may have a great variety of methods for accomplishing this much-desired result. Thus far the success has been achieved by alternating currents, and they certainly promise well for the future. The ease and flexibility, so to speak, of changing the phases of the current in alternating currents attract the inventive genius of the industry at the present time.

But the dynamos for the large installations of the future are yet to be developed. They are not to be small machines of merely 1000, 2000, or 3000 lamps, but they are to be of 50,000, 100,000, or even 200,000 lamps. The "armatures," so called, are to be built up in sections, with ready means of connecting together, and with safety appliances to prevent one bad section interfering with the lighting circuits. The field magnets, being free from trouble, are to be revolved and also divided into sections, so that the electricity can be cut out of one section without interfering with the other, the whole machine to be about like a long cylinder revolving inside a thin shell of armature coils. The whole steam plant is to be the perfection of steam engineering, studied to save labor and fuel, and to be thoroughly reliable.

Practically all the lighting in the large cities is to be done by electricity, and immense installations are to be common occurrences.

All places using small powers will adopt the electric motor. The great saving arising by distributing these small powers from power centres is already appreciated. Another great use of electricity is just commanding attention, and that is the distribution of parcels. Instead of blocking the streets with parcel-delivery wagons of the different firms, these parcels will all be distributed by electric carriers. The cities will save great sums in street and paving departments, and the individual firms will get their parcels distributed much more cheaply and more satisfactorily.

Possibly this scheme may meet the support of the philanthropic natures, who are advocating laws which will exclude dangerous electric currents because of a few deaths they have learned of. As more people were killed by teams in the streets of New York and Brooklyn in the last two years than have been killed by electric currents in the whole history of the world, any system which will reduce the number of these "fatal parcel carriers" to a minimum will appeal to their great love of human life for support. When the electric parcel carriers are established, perhaps a law can be passed which will prevent any firm from driving parcel-delivery teams about the streets and thereby killing an average of over one person per week in New York, instead of using the harmless parcel carriers worked by electricity.

The transmission of power by electricity in mining regions is to be extensively applied in the next few years. Mines that cannot be worked at present will be made very profitable by using electric motors worked from distant sources. This line of work is especially attractive because the great benefit arising warrants a large outlay of capital to accomplish it; so the electrical engineer will have the satisfaction of being able to make everything first class, without regard to cost.—*American Gas-Light Journal.*

THE TOILING MASSES, who make the wealth of the world, are too often considered as menials, while those who live upon the result of their labor, and never produce anything that makes mankind better or happier, are most respected.

The man who tills the soil, and who has the intelligence to properly direct labor, is a double benefactor. He helps those who are not able to help themselves because of lack of sufficient knowledge, and gives profitable employment to laborers; and by increasing the world's supply of food and provender, makes all happy who consume the product of his labor. Instead of so many seeking occupations only to profit by the labor of others, it would be far better if more turned to mother earth, and by joining the army of producers thus gain honor.—*The Sugar-Bowl and Farm Journal.*

THE DRY-AIR FALLACY WITH REGARD TO CONSUMPTION.

THE Congress of Climatology, which was held in Paris in connection with the Exposition, seems to have been interesting and important. About two hundred members were present, including the President of the French Meteorological Society, M. Renou, who was elected President of the Congress, and many other distinguished experts, representing fourteen countries. One of the best observers of them all appears to have been M. Youji Wada, a delegate of the Japanese Government, who spoke of the hot springs of Japan, and asked the Congress to explain why it was that before a cyclone the temperature of the water in the hot springs rose, while the evaporation diminished. No one was able to suggest a solution of this problem, or of another one, propounded by the same delegate, in regard to the influence of the discharge of smoke from volcanoes. Curiously enough, this convention of climatologists, including distinguished physicians from many of the most renowned health resorts, was nearly unanimous in ascribing very little virtue to the climate of such resorts, and, still more curiously, there was a diversity of opinion as to what qualities of climate would be favorable to invalids, provided they could be secured with certainty. Dr. Labat has found in the Isle of Bute, on the coast of Scotland, in the latitude of Labrador, "vegetation very similar to that of the south of France," while "at Nice would be experienced one of the worst climates of the world," and he considered that the real secret of the good effect of a change of air consisted in "the choice of the house where the patient lived," and "the hours and the place where he took exercise." Dr. Chiais, of Mentone, supported this theory, and believed that if delicate persons, staying in the Riviera for their health, would be more careful about their habitations, and the way in which they spent their time, many lives might be saved. He had found that during the winter, particularly in January and February, there were atmospheric perturbations on the Mediterranean

coast, which were accompanied by a great increase of dryness in the air; and these perturbations were "always followed" by "an increase of illness and dangerous symptoms." For this reason he thought that patients should study the hygrometer, and, on the approach of dry weather, should keep within doors until a change took place, using some means to evaporate water in their rooms, to supply the deficiency of moisture in the air. This observation, which is the more remarkable as contradicting nearly all our received notions as to the beneficial influence of dry air in consumptive cases, and in checking the diffusion of contagion and malaria, seems to have met with the approval of the Congress, although it was agreed, in another part of the discussion, that in the treatment of consumption the most favorable climate was a sunny one, free from dampness and wind, such as is found in many mountain resorts; and that, if these conditions were fulfilled, a low temperature was in many cases not injurious. Before adjourning, the Congress made the sensible suggestion that the professed health resorts were often so badly drained and policed, as to injure, rather than benefit, the persons who came to them. Dr. de Valcour, of Cannes, said that if it had not been for the pertinacity of the English visitors, no sanitary improvement would ever have been made in that town; and it was voted that in France sanitary legislation was desirable, to compel hotel-owners to adopt the measures necessary to avoid poisoning their guests with noxious effluvia.

Longevity of Women in Hungary.—Statistics collected by Fodor, and published in the *Deutsche med. Wochenschrift*, July 18th, 1889, indicate that in Hungary the life of women is materially shorter than that of men. Up to the age of thirty years there are more women than men in the population; after this age the proportion falls from 109.7 per cent to 85 and 95 per cent at the ages of eighty and over eighty years. This condition is the opposite, he states, to that found elsewhere in Europe, where the proportion of living women to males is 105.5 per cent at thirty years of age, and rises to 144 per cent after eighty years.—*Medical and Surgical Reporter.*

HEREDITY IN DISEASE.

By JOHN SCHILLING, M.D.

A HEALTHY and vigorous bodily constitution is one where the tissues, and consequently the functions, are normal. The constitution is broken down, impaired, diseased, below par, when the tissues are abnormally changed. This takes place, firstly, as the result of too much or too little functional activity—viz., over or non-use of the tissues, or exposure to cold, heat, and fatigue, or inadequate construction material—viz., want of food, bad food, or abuses in the ingestion of alcohol, opium, etc. Secondly, infective disease, such as tuberculosis, syphilis, and, indeed, all acute diseases, leave the tissues in a somewhat impaired condition ; and although health may be re-established it is never quite so perfect again as it was before the attack of illness.

There is a general principle in nature that the offspring resembles the parent to a certain degree. A constitution is inherited, we say. Two healthy parents have sound and healthy offspring. Of course there are exceptions to this. If during gestation a healthy woman is subjected to an injury or suffers from inanition, etc., it will influence her blood, hence the food-supply of the fœtus, and thus cause some abnormal development in the form, organs or tissues of the fœtus.

If, on the other hand, the parents' constitution is impaired, broken down, the sperm and germ-cell and the subsequent fœtus suffer proportionately. This broken-down constitution may have all degrees. The destructive process may have gone so far that the parents are completely sterile. It may have gone only so far that the ovum perishes after two months' gestation. Or the fœtus may die at six months or at full term. Or the child may be born alive, but too lowly organized to live long, or, lastly, the offspring may be but little short of perfect health. We can well understand that the viability and vigor of the child depends upon the condition of the parents' health during the process of its formation. It is evident, too, that the child has lower vitality if both parents have been con-

stitutionally below par than if either one alone. Now it does not matter what caused the broken-down parental constitution, whether tuberculosis, syphilis, exposure or insufficiency of food ; this condition of dissolution of the tissues and of defective organization is stamped upon the germ and sperm-cell, so to speak, and grows with the being originating from these—"it is inherited by the offspring." This inherited constitution has been called, variously, scrofulosis, cachexia, marasmus, etc. ; but let me say here that all these names mean essentially the same defect, differing only in degree, and this again depends upon the extent of the parental disease which caused the imperfection of the fœtus. Thus, also, a diathesis means but a lesser defect in the organism or a lesser resisting power of the tissues to disease processes, to injuries, and to the inroads of bacteria. So that no particular disease is inheritable as such—not even insanity. For instance, a mother has a local defect—a cicatrix or an old cavity in her lung, the remains of an arrested process of tuberculosis ; her vital powers have been lessened during the active stage of the affection ; her tissues are no more quite perfect ; the ovaries and the germ-cells have shared likewise in this process of dissolution. But there are no more bacilli in the blood or in the tissues at large, neither in the germ-cells. Besides, how can the bacilli enter the minute germ or sperm-cells before fecundation so as to make them tuberculous, syphilitic, etc. ? This would surely cause their destruction—at least their sterility. Now, the child developed out of them has the same tissue-organization, the same weak vitality or lessened resistance to processes of disease. If it be injured by a fall, by cold, or by a blow, the respective tissues will undergo destruction sooner and more readily, the more pronounced this diathesis or systemic weakness is. If the child is then exposed to bacteria—and where is one not exposed to these fiends ?—they will immediately take hold on these weak spots and aid materially in the destructive process. And according as these microbes are bacilli of tuberculosis or of syphilis, or of osteomyelitis, etc., the established disease will be one of tuberculosis, syphilis, or osteomyelitis. Therefore the assertion that the offspring inherit a liability to a certain disease—a diathesis—is wrong. They inherit simply a liability to any disease, not to that one alone which their pro-

genitors have. The inherited lower vitality, imperfect development, defective tissue-organization, is liable to succumb to the ravages of any disease-germs. That, however, the children mostly possess the same disease as their parents, is self-evident from the fact that they are mostly exposed to that disease. They are, later on, infected by actual contact, as a kiss, or by inhaling infected air.

Finally, there is one event which usually takes place together with inheritance and which has been mostly confounded with it, and that is transmission of a disease from mother to child in utero. But that is not heredity at all ; that is really infection. And by that any particular disease is transmissible as such. So a tuberculous or a syphilitic mother will have a tuberculous or a syphilitic child. The respective bacilli swarming in the placental blood can enter the fœtal circulation or tissues.

Insanity is likewise not inheritable as such, although it is claimed to be so. An imperfect arrangement of the nervous centres, destruction of the nerve-tissues, nerve-fibres, or cells by tubercles, gummata, circumscribed tumors, narrowing of the axis-cylinder, lack of inter-central connections, compression of the cells, atrophies, sclerosis, etc., similar to the defective organization of any other tissue in the human body, are inherited by the offspring. And if to such conditions, which make the individual already hypersensitive and hyperconvulsive, the exciting cause be added, there will be an outbreak of emotional insanity.

In conclusion, let us recapitulate the following points :

First—heredity of an impaired constitution. A diathesis to all diseases, not to a particular one, is inherited if the parental constitution is broken down by infectious or non-infectious processes, by diseases or other injurious circumstances. In this case the mother must be free from infection, or the latter must be at least quite local, as a small tuberculous area in a lung, for instance. So far we can speak of inheritance.

Secondly. If the mother is still infected the respective disease is transmitted to the fœtus in the regular manner of infection. *A priori*, it is evident a disease is hardly ever or never inherited as such, but is always acquired ; although an inherited diathesis is sometimes so severe as to be itself called a disease.—*Weekly Medical Review.*

THE MEDALS, JETONS, AND TOKENS ILLUSTRATIVE OF SANITATION.*

By Dr. HORATIO R. STORER, Newport, R. I., Member of American Public Health Association, etc.

X. *Epidemics.* Continued from page 455, vol. XXIII.

IN my last I mentioned the medal of Dr. Richard Carmichael, of Dublin, stating that I had never seen its description. I am now able to make good this omission, through the kindness of William Frazer, Esq., M.R.C.S.I., of that city.

1141. Obverse. Bust, draped, to left. Beneath, on bust, J. Woodhouse A R H A [Associate Royal Hibernian Academy] Inscription: Richard Carmichael.

Reverse. Field vacant for name of recipient. Inscription: Carmichael School of Medicine. Founded 1828. 24.

William Frazer. "The Medallists of Ireland and their Work." *Journal of the Royal Hist. & Arch. Assoc'n of Ireland,* July, 1887, p. 193.

In the same connection, I described the three medals of Dr. John Hunter then known to me, Nos. 1143–4–5. There is, in addition, the following:

1143ª. Obverse. Head to left, with flowing hair. Upon either side of neck 17 – 28 Inscription: J O H N H V N T E R

Reverse. Within laurel wreath tied by ribbon: Presented | By The | St. Louis | Dental Society | To | here follow the student's name, that of the College, and date of presentation, engraved in script. Gold, 16 carats. 28. Thickness 3.

This is the prize medal of the Missouri Dental College, and is given through it by the St. Louis Dental Society to graduates receiving the highest vote at the final examination. For impressions I am indebted to Professor W. H. Eames, of St. Louis. It is hitherto undescribed.

* The previous portions of this paper will be found in THE SANITARIAN for May, July, August, October, 1887; February, April, July, August, November, 1888; February, March, April, June, September, and November, 1889.

I have discovered two additional English medals of The Plague :

739[a]. Obverse. Bust of Queen Elizabeth, etc.

Reverse. Phœnix amid flames, etc., with long poetical Latin legend. 1574. Silver. 28.

Grueber. "Guide to the English medals in the King's Library, British Museum," 1881, p. 5, No. 20.

Indicating the apprehension for the Queen's life occasioned by the severe plague which visited London in that year. Unmentioned by P. and R. In the British Museum.

739[b]. Obverse. Shrine, with crucifix, etc., and St. Paul shaking the viper (The Plague) from his hand. Legend : Mera (Mira) Bonitas.

Reverse. The City of London, half in flames, and the remainder under a tempest. In front, beside the troubled Thames, Death (The Plague) and a warrior (the Fire) contending on horseback. Above, the eye of Providence, comets and wind. Legend : Sic Punit Exergue : MDCLXVI. Silver. 25.

Ibid., p. 43, No. 216, pl. IV, fig.

To commemorate the purification of London from plague infection by the great fire of 1666. Unmentioned by P. and R. In the British Museum.

I have also received information of a new cholera medal.

1062[a]. Obverse. Evil demon to left, casting necklace to right, and holding sword in left hand. Inscription.

Reverse. Inscription in wreath : "Pra Paramander Maha Chuleh Tong-Kan Klow." 5th King. 1868.

Given for attendance on the sick in Siam during the cholera in "1243" = 1881. 39.

The above description I owe to Messrs. S. H. and H. Chapman, of Philadelphia, who have the medal.

In Section X, under Group XIV, Phthisis, the contagious character of which is rapidly becoming recognized, I might have mentioned the English royal "touch-pieces," an accompaniment of what was the "faith cure" of their day, in all forms of scrofula. I intend describing them in my paper upon the medals illustrative of the science of medicine, now being published in the *American Journal of Numismatics.*

I should add that, through some inadvertence in the description of the reverse of the second of the medals of Dr. Benjamin Rush, No. 1065, the words Above, Sydenham were omitted.

XVIII. Scurvy.

A. France.

Dr. André Falconet, of Lyons (1612–91). Work on Scurvy.

1193. Obverse. Coat of arms, above which : Dirigit Et Firmat. Inscription : André Falconet Con^r (Conseiller). Medicin Du Roy Etc.

Reverse. A couching lion, against which a hand is thrust from the clouds. Legend : Quem. Regimus. Quisnam. Post. Hoc. Impune. La . . . . et (Lacesset). Exergue : 1667.

Duisburg, Suppl. II., 1868, p. 7. Unknown to Rudolphi and Kluyskens.

B. Germany.

Dr. Christian Andreas Cothenius (1708–89). "Casus de purpura scorbutica," etc. Magdeburg (1732), 4°.

1194. Obverse. Bust, to left. Beneath, J. A(bramson). Inscription : Christianus Andr.Cothenius Acad.Caes.Natur Cur.Dir.Consil.Int.Et Arch.Reg.Boruss.

Reverse. Laurel wreath, within which : Praemium Virtutis Salutem Mortalium Provehentibus Sancitur D. 5. Jan. Silver. 50 mm.

Rudolphi, 1829, p. 37, No. 146 ; Kluyskens, i., p. 228, No. 1 ; Duisburg, p. 134, ccclx., No. 1.

1195. Obverse. Bust, to left. Beneath, J. A. Inscription : Christian Andr.Cothenius Consil.Int.Et Arch.Reg.Bor.

Reverse. Dir.Et Dec.Coll.Med.Supr.It.Dir.Coll.Med.Chir. Ac.Sc.Berl.Sod.S.R.I.Nob.Et Com.Pal.Dir. A. N. C. Nat. Anclami 1708 Artem Qua Profecit Regi Principibus Militi In Castr.Civi.Colono.Orphano Annis 43 Exercuit. Silver. 43 mm.

Kluyskens has Beri and Profuit, and dots after Anclami and the date, Regi, Principibus, Orphano, and 43.

Kluyskens, i., p. 228, No. 2 ; Duisburg, p. 134, cclx., No. 2.

Unknown to Rudolphi.

Scurvy will also be referred to under Naval Hygiene.

XIX. Epizootics.

There has been a suggestion made, which if correct would go to prove that the ancients were more proficient than has been supposed in veterinary medicine. It is based upon the following imperial coin from Parium, in Mysia.

1196. Obverse. Head of the Emperor Commodus.

Reverse. Male figure seated, raising the right leg of an ox standing before him. Legend : Deo Aesc(ulapio) Sub(venienti) Bronze.

Ogle, Harveian Oration for 1880, p. 91.

This is in the British Museum. Panofka (Asklepios, *Abhandlungen*, etc., of the Berlin Academy, 1845, and reprint, Berlin, 1846) pronounces it to be Æsculapius "trying his first experiments in medicine."

A. The United States.

Dr. Lewis Feuchtwanger (1805–76), of New York. "The Mad Dog ; or, Hydrophobia with all its Various Symptoms," etc. New York, 1840, 8°.

1197. Obverse. Inscription : Dr. L. Feuchtwanger, American Silver Composition. 377 Broad-Way New-York.

"Dr. F.'s metal." 16½. Extremely rare.

Dr. F. was an educated physician, whose fondness for chemistry led him to experiment upon the metals most suitable for a national currency. He is known to every American numismatist by his series of very rare tokens and "pattern" pieces, several of which are in my collection. Six of this series will be found in the Wood Catalogue, p. 87, Nos. 1384–90 ; eight in the *Coin Collectors' Journal*, X., 1885, p. 71 ; and nine in the Woodward Sixty-seventh (Levick) Catalogue, Nos. 413–21.

Dr. Benjamin Rush. "Observations on the Nature and Cure of the Hydrophobia."

"Remarks upon the Hydrophobia." *Am. Med. and Phil. Register*, N. S., July, 1813, p. 16.

"A Letter to Dr. Hosack on the Hydrophobia." *Ibid.*, 1814. Already mentioned in several connections in the present Section.

In Section VIII., Diet, reference was made to the paper upon "Hippophagy," by Dr. H. I. Bowditch, of Boston, so often hitherto mentioned.

B. Holland.

Dr. Peter Camper, of Leyden. The first to inoculate in animal epidemics; though this has been disputed by Dr. Louis Willems. He established a Society in Frisia therefor. Already described in the present Section, under Inoculation.

Dr. Louis Willems. A claimant for the discovery of inoculation for pleuro-pneumonia, previously recommended by Camper, as just shown.

1198. Obverse. Head to right. Beneath, Leopold Wiener. Inscription: Dr Louis Willems—Né A Hasselt Le 26 Avril 1822.

Reverse. Laurel branches tied by ribbon. Within: A | L'Inventeur | De L'Inoculation | De La | Pleuropneumonie | Exsudative | De L'Espèce | Bovine | 1855. Bronze. 39. 60 mm.

Kluyskens, ii., p. 618; *ibid.*, Num. Med. Belge, p. 30; Duisburg, p. 185, diii. In the Lee Collection and my own.

C. France.

Dr. J. B. N. Boyer, of Paris. An authority upon Epizootics (Duisburg).

Already considered in this Section, under General Epidemics.

Dr. Louis Pasteur (1822–), of Paris. "Sur les maladies virulentes, et en particulier sur la maladie appelée vulgairement choléra des poules." Paris, 1880, 8°.

"La vaccination charbonneuse." Paris, 1883, 8°.

"Le traitement de la rage." Paris, 1886, 8°.

"Nouvelle communication sur la rage." Paris, 1886, 8°.

One of his medals, by Ringel, has been given in the present Section, No. 709, under General Epidemics.

1199. A dog in the typical attitude of rabies, torn garments

under its fore-feet. Near by, a fearless child, nude, and holding in its hand a branch of laurel. Silver.

Conferred by the Academy of Sciences of Barcelona, Spain.

My information of this medal is derived from an article upon Pasteur in the *Nineteenth Century* for June, 1888 (pages 856-7), by Mrs. Dr. William O. Priestley, of London.

A year ago, up to the middle of 1888, Dr. Pasteur had received no less than sixteen gold medals from learned and industrial societies, and several of silver, besides the Barcelona medal just described. Among them are the following (*Le Pasteur*, April, 1889, Vol. I., No. 2).

1200–14. The "Copley" and "Rumford" medals of the Royal Society of London; the "Albert" medal from the London Society for the encouragement of Arts and Manufactures; and medals of honor from the French Academy of Sciences, Industrial Society of the North of France, Brewers' Exposition, the Society of French Agriculturists, the Central Committee of Sologne, Spinners' and Silk Throwers' Association, Society of Agriculture of Melun, and that of Cantal, and "of all the learned societies of France." One by Alphée Dubois is mentioned in the *Revue belge de num.*, January, 1889, p. 217.

D. Germany.

Dr. J. P. Frank. "De morbis pecudum," etc. Ticini, 1790, 8°.

Already considered under Section I.

E. Denmark.

Dr. Adam Wilhelm Hauch, of Copenhagen (1755–1838). The founder of the Veterinary College at Viborg.

1215. Obverse. Bust. Beneath, Christensen F. Inscription: Adam Wilhelm Hauch. P. 26 Septbr. 1755. D. 26 Febr. 1838.

Reverse. A female, with crown in right hand, and in left an inverted spear. Inscription: Dyden Alene Adler.

Duisburg, Suppl. I., 1863, p. 11.

Unknown to Kluyskens.

These are other medals interesting in this connection.

A. The United States.

a. Ohio.

1216. Obverse. Within a circle, a drayman beating a fallen horse ; an angel, with drawn sword, upbraiding him. Inscription : The Ohio State Society For The Prevention Of Cruelty To Animals.—

Reverse. Field blank, for inscription. Below : Member Of | S.P.C.A. Bronze. 32. Edges beaded.

This is in my collection. I have not found it described.

b. Pennsylvania.

1217. Obverse. Device and inscription similar to the last, save as to the name of the State, and that there is a final dot instead of dash.

Reverse. A wreath of oak leaves bound by ribbon. Field vacant for name of recipient. Below, simply the word, Member. White metal, bronze. 20.

This is in my collection. It seems hitherto undescribed.

c. South Carolina.

1218. I have not yet seen this medal. R. C. Davis Cat., 22–26 January, 1890, No. 2061.

B. Belgium.

1219. Obverse. Dead cattle in foreground, with people supplicating heaven (represented by clouds). Behind, men removing and burying other carcasses. Exergue : N.V(an). S(winderen).

Reverse. Het Zieke | Vee Van Stal Geleid | Sterft Aanstonds Wech, De | Landman Schreit, | En Zend, Geknield, Tot Gode | Zyn' Klagten, | Om Hulp Van Zyn Genâte Wagten. | Maar Ligt Zal't Jammer, Dat Hen | Plaagt, | Zoót Land Voort aan Geen Vrugten | Draagt, | Die Boete En Waar Beron | Vertoonen, | Zoo Weinigt Volk, Als | 't Vee Verschoonen | 17–47. (The figures of the date are separated by an upright bunch of arrows, tied by ribbon.) Silver. 25.

Van Loon, 311 ; Völcker Cat., Amsterdam, April, 1888, No. 1519.

This is in my collection. It is in memory of bovine pest.

1220. As preceding, but without date. Silver. Völcker Cat., No. 1520.

1221. Obverse. Head of Leopold I., to left. Beneath, Braemt F.

Reverse. A crown of wheat, flowers, and fruit. In field: Ecole Veterinaire Et D'Economie Rurale. Silver.

Guioth, pl. 27, No. ccxxi.; Thieme Cat., October, 1886, No. 2520; Coster Cat., Brussels, 1885, No. 1134.

1222. As the above, but smaller. 19 mm.

Guioth, pl. 27, No. ccxxii.

These last are of a veterinary college at Brussels.

1223. Société protectrice des animaux. 1878. Chalon Cat., Brussels, 1889, No. 1095.

C. France.

a. Paris.

There exists here a society for the promotion of the use of horse flesh as food, of whose issues I find the following:

1224. Silver. Given to the owner of the first establishment for the sale of the viand at Lyons.

American Journal of Numismatics, April, 1877, p. 85.

1225. Gold. Given to the owner of nine such shops at Paris. *Ibid.*

The above might have been mentioned under Section VIII., Diet.

D. Austria.

a. Vienna.

1226. Obverse. Laureated bust of the Emperor Franz I.

Reverse. The veterinary building. Silver. 50 mm. Cut by Harnisch.

Wellenheim, 8535; Thieme Cat., October, 1886, No. 2411; Helbing, Verzeichniss No. IV., 1887, No. 356.

Upon the founding of the Veterinary College, in 1823. In the R. C. Davis Cat., 22–26 January, 1890, No. 2072, this is spoken of as belonging to Vienna. I am as yet uncertain as to the precise locality.

(*To be continued.*)

CHOLERA IN MESOPOTAMIA AND PERSIA.

THE *Journal d'Hygiene* for December 5th reports "that, for some reason unknown to us, the last two weekly reports sent from Constantinople by our faithful correspondent, Dr. Gabuzzi, have not reached us.

"We invite the special attention of our readers to the very serious condition revealed in the subjoined letter from Constantinople, November 27th, 1889:

"'Cholera is at Mossoul; all the country watered by the Tigris and the Euphrates is invaded by the epidemic, and this epidemic will continue its course to the south and to the borders of Syria if the winter season and abundant falls of snow, by intercepting the communication, do not accomplish what has been unsuccessfully attempted by sanitary and military cordons.

"'Mossoul is a city in direct communication with Diarbekir, Aleppo, and Damascus; separated from Aleppo and Damascus by the desert, it is very probable that cholera, pursuing its course by Erzeroum and Trebizond, will make its appearance on the shores of the Black Sea, and thence threaten Europe.

"'And again: information regarding cholera in Persia, reported by telegrams from Kermanchah and Teheran, is that the epidemic continues to be severe at Hamadan.

"'From Hamadan to Teheran, and from Teheran to Recht, on the Caspian Sea, the communication is very easy.

"'Besides, if cholera, as announced, rages at Bokhara, the epidemic may threaten Europe from this side by way of Astrakhan and Baku-Batum. Sad forebodings for the future!

"'DR. GABUZZI.'"

On this communication the editor remarks:

"It will be remembered that in 1883, when cholera appeared at Damietta, in Egypt, in order to avoid recognizing its indigenous—*autochthonic*—origin, and to make its introduction from India probable, the official sanitary physicians devised

the twofold legend—that of the fireman of the *Timor*, who still remains undiscovered, and that of the two merchants from Bombay, with head dresses after the manner of the dervishes who were seen at the fair at Chekb-Abou-el-Maati. The inquiry made afterward showed to the satisfaction of the delegates from the Egyptian Government that these merchants came from Cairo and had never crossed the sea. 'The introduction of the disease by the bodies of Mussulmans Chiltes from Bombay—the place where cholera originated—enclosed carefully in caskets on their way to be buried in the holy cities Nedjeff and Kerbellah.'

"In the mean time, we will point out the curious circumstance of an Inspector-General in the Sanitary Service of Turkey, commissioned to study the etiology of the present epidemic where it raged, going to Paris for the purpose, the official journals say, 'of consulting with M. Proust, the Inspector-General of the Sanitary Service in France, regarding the best means of rendering the mission with which he was charged most profitable to the public health.'"

In the *Journal* of December 12th, the editor reviews the present epidemic *de novo*, as follows:

"As was announced in one of his earliest letters by our learned and attentive correspondent, who is a strong partisan of the Indian origin of cholera, 'No fact, no information has as yet reached us to confirm this etiology.'

"The pilgrimage to Mecca in 1889, like those of 1887 and 1888, were made under favorable sanitary conditions as far as regards the special danger from cholera and choleraic diseases.

"The pilgrimages of the Mussulmans from India to the holy cities of Mesopotamia, Nedjeff, and Kerbela have terminated without any outbreak whatever of disease.

"This epidemic, which we unhesitatingly call autochthonic—indigenous—broke out on July 27th last instantaneously, and like a clap of thunder, at Chatra, on the Chat-el-haï, a city situated some days' journey from Bagdad.

"Some physicians say that previous to this date—that is, during the month of July, some isolated cases of choleraic attacks were observed at Chatra. But is not that the usual way of invasion observed in those epidemic diseases which have some relation with the prevailing condition—*constitution médi-*

cale régnante—of the epidemiologists of the seventeenth and eighteenth centuries, which the modern school would exclude entirely from our works on diseases? During the first eight days, two hundred deaths were registered.

"On August 1st, the village of Nasrié was attacked with such violence that all the small houses and huts of which it was composed were burned in the hope of destroying the scourge.

"During the early part of August, cholera was first observed at Bassorah, an important city situated toward the south, on the left bank of the river which is formed by the junction of the Euphrates and the Tigris, and empties toward the north into the Persian Gulf.

"Bassorah is the place of debarkation for the pilgrims from India, on their way to Nedjeff and Kerbela. There are landed the caskets containing the bodies of the rich Mussulmans Chiltes, who consider it as their supreme happiness to be buried in the vicinity of the holy cities.

"These transfers, which occur during the whole year, are governed by a special agreement between Turkey and Persia.

"The journey is very long, and is made partly by land and partly by water.

"In view of this strange invasion of cholera, which overthrew all the notions and theories generally received, the sanitary medical officers, wishing to hold to their old convictions, put forward the story of the contraband inhumations.

"According to them cholera was imported, either in the bodies enclosed in caskets, more or less perfectly sealed, coming from Bombay, or in the soiled clothes in which they were wrapped, or even by the friends or relatives by whom the bodies were accompanied.

"The improbability of this account must be apparent to all. Why, as a consequence of these transportations, should cholera appear in the month of July, 1889, while the same transport of bodies was made during the whole year, and during several preceding years, without the slightest accident of that nature?

"Besides, it is hard to imagine that the coffins of these Mussulmans, who belong to the class that are rich or in easy circumstances, can be thus scattered in every direction, as well as the soiled linen with which they were surrounded.

"And further, these latter cannot be in a state of humid decomposition, and we are not aware that the bacillus of Koch preserves sufficient vitality to be easily regenerated under similar conditions of time and circumstances.

"From a geographical point of view, how explain the outbreak of the epidemic at Chatra and Nasrié before it appeared at Bassorah, the point of departure for the pilgrims across Mesopotamia?

"The spontaniety as well as the suddenness and the gravity of the first manifestations in the two circumscribed localities, far from the banks of the Tigris, should be strong and conclusive arguments in favor of the indigenous development of the disease.

"If cholera had been really brought from Bombay, and first took firm hold at Chatra, would it not have been possible to circumscribe and stamp it out at that place where it was first manifested?

"And yet, neither the flames which consumed the huts in Nasrié, nor the sanitary and military cordons which surrounded the two points first attacked, have been able to destroy the infecting germs.

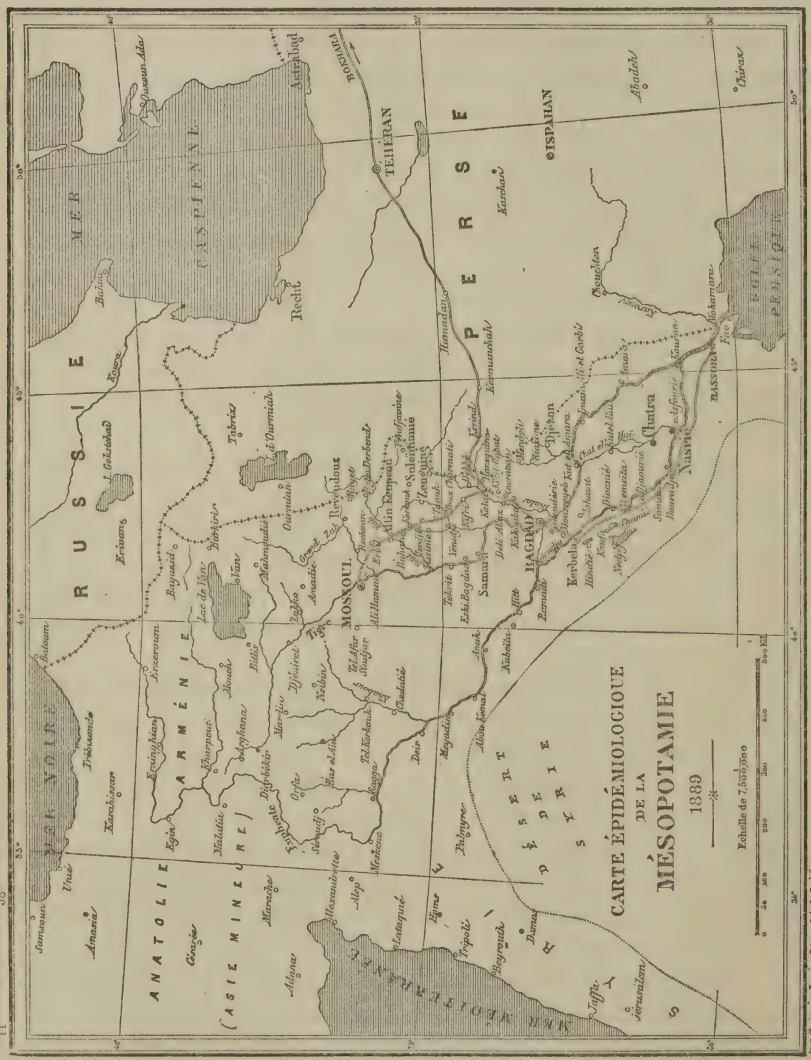
"Like a spot of oil, the epidemic spread from day to day over all the territory embraced between the Tigris and the Euphrates.

"The numerous and rigorous sanitary cordons have been unable to protect Bagdad, a city of 70,000 inhabitants, which was attacked on August 14th, and contributed very largely to the death-rate. From August 20th to 30th the deaths from cholera ranged from 100 to 200 daily.

"On August 29th the epidemic was at its height in all the country included between the Euphrates and the Tigris, forming a triangle, of which the cities of Bassorah, Remieta, and Samara formed the extreme points.

"On September 1st the sanitary cordons were removed from the banks of the Diala and the lesser Zab, a tributary of the right bank of the Tigris, in order to protect Altin-Keupru and the Turco-Persian frontier, but their stay there was of short duration, and they were soon moved back to the greater Zab.

"From another direction cholera crossed, on September 2d, the line of defence at Tekrit, and extended to Khartoum on the


CARTE ÉPIDÉMIOLOGIQUE
DE LA
MÉSOPOTAMIE
1889
Échelle de 1:500,000
RUSSIE
PERSE
ANATOLIE
ARMÉNIE
MER NOIRE
MER CASPIENNE
MOSKOU
TEHERAN
ISPAHAN
BAGDAD
Chatra
Nasiriè
Kerbela
Samarah
Hillah
Diyalah
Kermanchah
Kurdistan
Khouzistan
Chiraz
Abadeh
Reshd
Astrakhan
Erivan
Erzeroum
Bayazid
Van
Tiflis
Tebriz
Ourmiah
Hamadan
Kermanchah
Mossoul
Diarbekir
Orfah
Alep
Damas
Jaffa
Jérusalem
Tripoli
Beyrouth
Saida
Tyr
Acre
Nazareth
Naplouse
Gaza
Port Said
Suez
Ismaïlia
Zagazig
Tell el Kebir
Alexandrie
Le Caire
Ramleh
Damiette
Rosette
Port Saïd
Bassorah
Mohammerah
Koweit
Ouadi
Euphrate
Tigre
Karoun
Kerkhah
Diyalah
Chatt el Arab
Golfe Persique
Mer Rouge
Mer Morte
Mer Noire
Mer Caspienne
Lac de Van
Lac d'Ourmiah
Lac Reschd
Lac Urmi
Lac Salé
Lac Amers
Lac Menzaleh
Lac Bardawil
Lac Timsah
Lac Abou Dir
Lac Abou Ballah
Lac Kurna
Lac Hamidiyeh
Lac Hammam
Lac Habbaniyeh
Lac Razazah
Lac Sabkhah
Lac Dibbis
Lac Ain Kerpeh
Lac Ain Dardar
Lac Ain Tamr
Lac Ain Kebir
Lac Ain Sefni
Lac Ain Sefra
Lac Ain Sefra
Lac Ain Sefra

seventh. It was at Deir and Zebarkoub that the lazarettos to quarantine the caravans from Aleppo and Bagdad were established.

"To the south of Mesopotamia, the refugees from Bassorah crossed the Persian frontier, and the epidemic reached Mahamara, Chouchter, and Bouchir, and also the villages along the Karoun.

"With this first entrance into Persia coincide, on September 10th, the second, by way of Amara, and the third, by way of Hanaguiné and Kerin on September 26th, and these extended to Korind, Kermancha, and Hamadan, cities not far distant from Teheran.

"In the early part of October a panic was prevailing at Kermancha, and the situation here was rendered all the more alarming by the prevalence of a very fatal epizootic among the cattle in this province, in addition to the cholera.

"From October 14th to 26th the cities of Erbil, Revendouz, and the smaller villages between the lesser and the greater Zab were successively invaded.

"In the early part of November, at the north as well as toward the south, all the vast level country of Mesopotamia included between the Euphrates and the Tigris was attacked. The epidemic, although decreasing at Bassorah and Bagdad, was more active toward the Turco-Persian frontier.

"It was on November 10th that the first case of cholera appeared at Mossoul, a city of 50,000 inhabitants. On the 18th there were 30 deaths a day.

"According to the reports published by the Board of Health, from July 27th to November 18th, the number of deaths officially registered was 7142. As Dr. Gabuzzi very well understands, the existence of cholera at Mossoul causes its dread of extension in the direction of the Black Sea, by way of Diarbekir, Erzeroum, and Trebizond.

"The course toward the Caspian, by way of Hamadan, Teheran, and Recht, is no less to be feared, because the safety of Russia is involved, especially if the reports of the presence of the epidemic at Bokhara be confirmed.

"To reach the Syrian coast of the Mediterranean, by way of Aleppo and Damascus, will be much more difficult.

"To sum up: the present epidemic in Mesopotamia has

been severe and unexpected, and its rapid expansion has carried it beyond all the cordons, military and sanitary, which were formed as impassable barriers to its progress.

"Under these circumstances, we will see with peculiar gratification the success of the measures proposed by M. le Baron Larrey to the Academy of Medicine as follows:

"'The continued success of the sanitary measures adopted in Persia and in the surrounding countries, and also in Russia and in Europe, will suffice, no doubt, to limit the extension of this new epidemic of cholera.'"

For the better understanding of the course of the epidemic, we have had a map of Mesopotamia made by M. Chaix, using the one already published by the *Revue Medico-Pharmaceutique de Constantinople* (APERY), but we have given a better outline of the vast region comprised between the Mediterranean and the Persian Gulf on the west and south, and the Black Sea and the Caspian on the north and east. [The map reproduced is diminished to nearly half size.—EDITOR.] T. P. CORBALLY.

SCARLET-FEVER MUST BE QUARANTINED.—In Section 9 of the act creating the State Board of Health of North Carolina, Code of 1885, inland quarantine is defined as follows:

"Inland quarantine shall be under the control of the county superintendent of health, who, acting by the advice of the local board, shall see that diseases dangerous to the public health—viz., small-pox, scarlet-fever, yellow-fever, and cholera, shall be properly quarantined or isolated at the expense of the city, or town, or county, in which they occur. Any person violating the rules promulgated on this subject shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined or imprisoned at the discretion of the court. In case the offender be stricken with disease for which he is quarantinable, he will be subject to the penalty on recovery, unless in the opinion of the superintendent it should be omitted. Quarantine of ports shall not be interfered with, but the officers of the local and State boards shall render all the aid in their power to quarantine officers in the discharge of their duties, upon the request of the latter."—*Bulletin of the North Carolina Board of Health.*

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

HEALTH OF THE NAVY.

Surgeon-General John Mills Browne reports for the fiscal year ending June 30th, 1889:

"The number of persons examined for the naval service, including apprentice boys, during the year 1888, was 10,000; of this number 3914, or more than one third, were rejected for physical disqualifications. The number of rejected for color-blindness was 130, a ratio of thirteen in a thousand.

"The number of patients admitted to the sick list and under treatment during the year 1888 was 11,499; of this number 7820 were on vessels afloat, 1527 in hospitals, and 2152 at navy-yards and shore stations. The daily average of sick on vessels afloat was 160. The average each case was under treatment represented a loss of seven and one half days. Eighty-seven in a thousand were invalided to hospitals, and only six in one thousand died.

"The total number of deaths in the naval service during the year 1888 was 123; of this number 57 occurred on vessels afloat and 66 in hospitals and on shore stations. The death-rate was increased by 16 cases of accidental drowning. The ratio was 12.35 in one thousand for the entire service.

"Of insane, there were 78 patients belonging to the Navy treated in the Government Hospital for the Insane, in the District of Columbia, for the year ending September 30th, 1889. Remaining in hospital September 30th, 1888, 64; admitted during the year ending September 30th, 1889, 14.

"Discharged during the year: Recovered, 9; improved, 1; died, 2: 12.

"Remaining in hospital September 30th, 1889: Officers, 7; enlisted men, 59: 66."

The sanitary condition of the hospitals and navy-yards, generally, are said to be in a good condition. The exceptions are :

The barracks of the Boston Navy-Yard, where there is no provision for the isolation of a sick person when suddenly attacked. The additional requirements are specified and recommended.

At Pensacola barracks, there has been a good deal of sickness among the marines for two years, chiefly malarial, attributed to sleeping too near the ground, three and a half feet from the floor. On the contrary, the officers and families who have slept on upper floors have enjoyed excellent health. It is recommended that the barrack dormitories be raised ten feet in the clear from the ground, and the space beneath be used for drills and exercises.

At Mare Island, Cal., a "Ducker portable field hospital" is to be substituted for an old semi-decayed building, hitherto used as a *pest-house*, since originally used as an office by the commandant of the navy-yard. The sewerage of the yard has been improved somewhat during the year, but is still imperfect, and so, too, is the plumbing.

Museum of Hygiene : Medical Inspector Wells, in charge, reports : "The experience of the past year has demonstrated more fully than ever the necessity and value of a museum of this character. The health reports of States and cities received at this office indicate the widespread interest taken in sanitary science. The increase of visitors and applicants for special hygiene reports, the addition of sanitary appliances by inventors, the visits of students from the colleges and universities for study and observation, the contribution of books and pamphlets, are all evidences of the growing influence of the museum. The library is increasing daily. Nine hundred and sixty-one volumes have been bound since the last report, and about one hundred more, now ready, will call for another contract. It is recommended that a yearly allowance for binding be made to prevent accumulation of such work as in the past.

"The chemical department has been well occupied with work. Two hundred and fifty analyses have been made, being an increase of one hundred and three over the previous year. These included specimens of wine, compound medicines, drugs,

lemon juice, bread, beef extracts, whiskey, the Londonderry, Bear, Farmville, and Buffalo lithia waters, well water, and disinfectants."

VACANCIES IN THE MEDICAL CORPS.—"The Bureau called attention in its annual report of last year to the eleven vacancies then existing in the medical corps, and stated that a bill for the improvement of the condition of assistant surgeons, in rank and pay, had received the recommendation of the Department, and had been presented to Congress, with no near prospect of a successful issue.

"In addition to these six more occurred during the year, four by death and two by retirement. The transference of the Medical Examining Board from Philadelphia to New York, and the establishment of another board at Mare Island, has been attended with gratifying results without lowering the standard of proficiency in the examination, a greater number of candidates have presented themselves, and twelve have passed the examination.

"At present there are eight vacancies, and the Bureau has reason to hope that these vacancies will be filled at no very distant day."

Next follows reference to the report on the *Yellow-Fever* infection of the *Boston* and *Yantic*, made in detail by the medical officers on other pages, with which our readers are already familiar (Official Correspondence, Vol. XXII., p. 36).

Fumigation with sulphur was resorted to instead of steam, as recommended by the Board of Medical Examiners in the case, as follows :

"Report in relation to disinfection of U. S. S. *Boston*, by William Martin, Assistant-Surgeon U. S. Navy.—With a view to fumigation of the ship's stores five rooms, placed at my disposal in building No. 9, known as the 'Coopers' Building,' were fitted up, and rendered as air-tight as possible by the calking of crevices and covering of windows by boards and canvas. Clothes lines were stretched across the rooms to serve as a means of suspension for clothing, sails, hammocks, bedding, bunting, etc., the remainder of the stores belonging to the various departments to be scattered about the floors. The dimensions of each apartment were 20 by 20 by 15 feet, making a total capacity of 30,000 cubic feet.

"On December 29th the first lot of stores was transferred to the fumigating chambers, in which four ash buckets had been placed. A layer of charcoal put in each bucket was ignited and 75 pounds of roll sulphur were added.

"The rooms were closed at 3.10 P.M. and opened on December 31st at 9 A.M., giving an exposure of forty-two hours.

"On January 3d, 1889, at 10 A.M., the second lot of stores was subjected to the same process, the rooms remaining closed until the 4th at 1 P.M., giving an exposure of 27 hours. Instead of 75 only 50 pounds of sulphur were burned in each bucket.

"The final instalment of stores were exposed to the action of the sulphurous fumes at 8 A.M., January 5th, for nine hours. Fifty pounds of sulphur were burned in one and 25 pounds in each of the other buckets.

"Meanwhile the coal-bunkers had been emptied and the coal transferred to the *Nina*, to be consumed by that tug. All parts of the ship—the hold, lockers, and other spaces—were thoroughly cleansed by scrubbing and scraping. The bilges were pumped out until no sewage was perceptible.

"On January 5th the officers were transferred to the U. S. S. *Chicago*, the men to the U. S. S. *Vermont*, and the fumigation of the ship was begun. One bucket was placed in each of the following compartments: Orlop under ward-room bath-rooms; ward-room; paymaster's store-room under steerage; after magazine; engineer's compartment on berth deck; forward alley-way; tank orlop; after compartment on berth-deck; forward magazine; hold; chain-locker; yeoman's store-room; head.

"The sulphur was ignited about 3 P.M., and the ship closed. It remained so until the 8th at 11 A.M., affording an exposure of sixty-seven hours.

"Seventy-five pounds of sulphur had been placed in each bucket, making a total of 1575 pounds, of which only 1000 pounds were found to have been consumed on opening the ship.

"All parts of the vessel having been thoroughly cleansed, were then washed with a solution of bichloride of mercury (1.1000), and 1800 gallons were poured into the bilges.

"The ship is now undergoing repainting, after which the stores that had been previously sprayed with the sublimate

solution of the strength above given are to be returned to the ship.

"Through the courtesy of Dr. J. J. Kinyon, of the United States Marine Hospital Service, I obtained a number of tubes containing cultures of the following bacteria, which were placed about the fumigating chambers and the vessel while undergoing disinfection: *Bacillus pneumonial; bacillus typhi abdominalis;* bacillus anthracis; bacillus coli communis; bacterium of yellow-fever (Finlay)?; *spirillum choleræ Asiatical; staphylococcus pyogenes aureus.*

"After their exposure to the sulphur dioxide they were returned to Dr. Kinyon for examination, who reported that all yellow-fever germs (?) had been destroyed."

The *Yantic* and her belongings were subjected to the same process. But whether it will prove effectual on a return of these ships to a yellow-fever climate is yet to be known.

It has elicited considerable discussion, particularly, so far as appears, on account of the omission to provide any means for the supply of moisture in conjunction with the sulphurous acid fumes during the process. That sulphurous acid, *when so provided*, and used in sufficient quantity, not less than three pounds of sulphur to every 1000 cubic feet of air space, is an efficient disinfectant, we have ourselves several times attested in yellow-fever infected ships; also in scarlet-fever, measles, diphtheria, whooping-cough, and *small-pox* infected hospitals and houses, the opinions of some distinguished bacteriologists to the contrary notwithstanding.

Nevertheless, it hardly seems necessary for us to reiterate our often-expressed preference for steam, whenever and wherever practicable, as we believe it to have been in this case without injury to the ships, the fear of which was the reason for its omission, and probably would have been but for the want of sufficient explicitness in the recommendation for its use.

Disinfection with steam, indeed, after hanging fire for more than thirty years after its efficiency had been thoroughly and repeatedly demonstrated, until the progress in biological knowledge had advanced far enough to recognize its fatal effects to disease germs, subsequently discovered, at last seems in a fair way to be intelligently appreciated and universally applied.

Its use has been greatly promoted by the report of the

Committee on Disinfectants of the American Public Health Association two years ago, that

"Steam at a temperature of 110 C. (230° F.) maintained for one or two minutes, or of 105 C. (221° F.) maintained for ten minutes, will infallibly destroy the spores of bacilli, which constitute the most difficult test of disinfecting power known," and that the thermal death point was from 129.2° to 140° F., after ten minutes' exposure, of numerous micrococci and bacilli in active growth experimented upon: thus fully verifying the practical results in the destruction of yellow-fever by steam first nearly forty years before, and several times subsequently by this writer and some other persons who followed his example, and who were satisfied with the results even before the germ theory of the nature of such diseases was generally accepted, or the germs discovered and used as a means of demonstrating its potentiality.

A late number of the *Sanitary Record* reports some recent researches made by Von Esmarch on the action of steam as a disinfectant, by which it appears that the effects in relation to the destruction of bacteria depend not so much upon the temperature as upon the degree of saturation of the steam. If there is air with it, the power of destroying organic germs is very much diminished. Experimenting in the same way on the spores of malignant pustule, Von Esmarch found that while superheated steam, which was not in a condition of saturation at a temperature of 120° C., was unable to destroy the spores in half an hour, saturated steam at 100° C. destroyed them in from five to ten minutes.—Hence the importance of first *driving out* or exhausting the air in steam chambers before thoroughly closing them to the exclusive action of saturated steam.

THE NATIONAL HEALTH SERVICE.

The report of Supervising Surgeon-General John B. Hamilton, of the United States Marine Hospital Service, for the fiscal year ending June 30th, 1889, a volume of 477 pages and numerous diagrams, is of more than usual interest and importance by reason of its comprehensive account of the yellow-fever epidemic, and of its management in Florida the year before; the careful study of the disease; the progress made under re-

cent laws in the greatly needful equipment of the national quarantine stations, and of the increased scope of the service generally.

The *field* of this bureau, as viewed by its chief, "properly equipped, supported by liberal appropriations and empowered by law, can effectually guard against the introduction of contagious diseases from abroad, by means of information from consulates and the proper administration of the quarantines. The bureau can effectively aid the State Boards on the occasion of special epidemics, by sending skilled inspectors; the management of inland quarantines; the settlement of the varied and never-ending questions requiring a well-equipped laboratory and trained expert knowledge for their elucidation and the dissemination of the information obtained from all sources." The pronounced success of its work in the management of the Florida epidemic, and the prevention of its recurrence, notwithstanding many obstacles, fairly justifies this view of the subject.

That the Service has materially grown in public favor, proportionally with the support it has received from the National Government and the co-operation of the State Boards of Health, can scarcely be questioned by any intelligent observer.

The clinical observations, pathological studies, and laboratory notes here recorded, are, to say the least, abreast with the best work of the kind ever hitherto reported.

The chapter on Diagnosis of Yellow-Fever, by Passed Assistant-Surgeon John Guitéras, is especially remarkable for its clearness.

This is followed by a chapter on the treatment of the disease, by Dr. C. Fagét, of New Orleans, at Camp Perry, with considerable detail, which, on the whole, consists of *good nursing*, is conservative and sustaining without reliance upon special remedies. Dr. Guitéras wisely remarks on this and other treatment:

"The disease must be taken in hand from the start. The patient, who cannot procure at once a yellow-fever doctor and a yellow-fever nurse, counts with terror the valuable moments that are lost, and he certainly derives no benefit from this anxiety.

"The cases so successfully treated at Camp Perry by the

plan described in Dr. Fagét's contribution, received no medical treatment whatever in the first and second days of the disease.

"During the last epidemic the bichloride of mercury has been extensively used. The drug has been recommended by Drs. Sternberg and Gibier, who are inclined to believe that the microbe of yellow-fever invades the gastro-intestinal contents, and that it may be attacked there by the germicide. The results obtained by this treatment have not been better than those obtained by a symptomatic treatment."

Plans have been prepared, of which diagrams are here given for the construction of three disinfecting steamers; for disinfecting machinery at each of the national quarantine stations and boarding steamers in connection therewith, and a movable machine for steam disinfection—adapted to easy transportation on car trucks—to meet the necessities of any localized epidemic.

These plans comprise all the advantages of, and some improvements upon other machinery heretofore devised for their respective purposes, and are in the highest degree commendable, with special reference to the practical application of steam.

The laboratory work, at the building at present used for a marine hospital, at New York, is reported by Assistant-Surgeon Kenyoun, in charge. It has comprised a lengthy series of experiments in disinfection, chemical analyses, experimental and biological studies—all of practical value.

Tabulated statistics sum up totals: Seamen treated, 49,515; patients in hospital, July 1st, 1888, 881; admitted during the year, 12,848; treated in hospital, 13,729; discharged, 12,339; died, 475; remaining June 30th, 1889, 915; number of days relief in hospital, 373,892; seamen furnished office relief, 35,789; number of times office relief was furnished, 54,097; number of persons examined physically, including pilots, 3124; quarantine diseases, 104; quarantine cases, 179. Amount expended, $464,133.89. Tonnage tax collected, $477,047.20.

An abstract of the proceedings of the Quarantine Conference at Montgomery, Ala., in March, 1889; Report on the Prevention of Yellow-Fever by Inoculation, by George M. Stern-

berg, Major and Surgeon, U. S. Army; selected cases from hospital practice; report of surgical operations, and report of fatal cases, with necrosis, materially contribute to the value of the volume.

EPIDEMIC INFLUENZA, like cholera, usually arises in Eastern countries, from this standpoint, and pursues a westerly course independent of air currents; but populous communities, in regions subject to thick fogs, particularly when these are consequent upon a water-logged soil and during exceptional seasons of unusual warmth and extensive thaws in the winter time, are the most subject to it. Besides, however, it is generally thought to be contagious, though this is doubtful, and not rendered any more probable by the circumstance that when it enters a family all the members thereof are particularly liable to it, but less probably on account of communicability than the same household conditions and regimen. On the other hand, those who are the least liable to it are communities who occupy regions and localities the converse of those above designated, and households and individuals who are careful to maintain healthful household conditions and constitutional stamina fortified by good habits.

The symptoms are, in some degree, more or less familiar to everybody—those of an ordinary "cold in the head," preceded by a brief period of debility and loss of appetite, followed by pains in the head, back, and lower limbs, and sometimes by chilliness and succeeding fever. The whole period of illness, however, rarely extends over three or four days, except in persons in a previous state of debility from some other cause; those who have but little power of resistance, among whom there have been some bad and a few fatal complications, with bronchitis and pneumonia.

At the time of this writing, January 9th, there is a good deal published about its prevalence in New York and Brooklyn by the newspapers, and the extraordinary mortality from acute pulmonary diseases in these cities during the last week, measurably attributed to it, particularly among the previously infirm, as above referred to. Total deaths in New York during the week ending January 4th, 1202; death-rate, 39.37; the

previous week, 762—24.85 ; average of the corresponding week for five years, 790—25.74 ; from pneumonia, 298 ; bronchitis, 99. In Brooklyn, the deaths from pneumonia were 108 against 49 only during the previous week, and the death-rate 28.83 ; in Boston the death-rate was 43.00.

THE MANURE NUISANCE in New York City has recently been the subject of special consideration by the Section in Public Health and Hygiene of the Academy of Medicine, with the result of recommending that the Sanitary Code of the Health Department be so amended as to conform to the spirit and purpose of the following resolution :

" *Resolved*, That on and after the fifteenth day of May, 1890, it shall not be lawful to remove stable manure from any stable or premises in the built-up portion of the city of New York, or to cart the same within the city limits, without a permit from the Health Department, unless the manure be pressed and baled as required by the Board of Health, and be properly covered while being removed and carted, or be enclosed in tightly-covered barrels or receptacles approved by the Board of Health, so as to prevent the escape of all offensive odors and liquid matter."

MORE SMALL-POX IN PAPER MILLS : and again, to the disgust of the Massachusetts Health authorities, doubtless (see our preceding number), among the workers in *foreign* rags.

" HARTFORD, CONN., December 28, 1889.

" Mary Lombard and Celia King, who with eighty other women are employed in the rag room of the Seymour Paper Mill at Windsor Locks, have the small-pox, and the other women and the people of the town are much alarmed at the prospect of the disease spreading. The mill proprietors say that the rags used were thoroughly disinfected before being unloaded from the vessel which brought them from Egypt."

It would be interesting to know how the rags " were thoroughly disinfected before being unloaded from the vessel which brought them from Egypt."

STATE BOARDS OF HEALTH AND EXECUTIVE OFFICERS.

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THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—*Mobile*, 40,000 : Reports 72 deaths during November, of which 13 were under five years of age. Annual death-date, 21.6 per 1000. From zymotic diseases, 6, and from consumption, 14.

CALIFORNIA.—For the month of November, 1889, the Secretary's abstract of the reports received from 104 cities and towns, with an aggregate population of 884,400, the number of deaths was 992. Annual death-rate, 14.04. Deaths from consumption during the month, 156. From zymotic diseases :

Diphtheria and croup, 49 ; typhoid-fever, 40 ; typho-malarial-fever, 8 ; cerebro-spinal-fever, 9 ; diarrhœal diseases, 30 ; whooping-cough, 4 ; scarlatina, 4.

CONNECTICUT.—For the month of November, 168 towns, with an aggregate population of 759,022, report 896 deaths—218 being under five years of age. Annual death-rate, 14.1 per 1000. Deaths from zymotic diseases numbered 168, and from consumption, 121.

DISTRICT OF COLUMBIA.—Total deaths during five weeks ending November 30th, 418, of which 125 were under five years of age. There were 196 deaths in the colored population. Annual death-rate, 17.37. Zymotic diseases caused 80 deaths, and consumption, 58.

ILLINOIS.—*Chicago*, 1,100,000. For the month of November the Commissioner of Health reports : Total number of deaths, 1504, of which 610 were under five years of age. Annual death-rate, 16.41 per 1000. From zymotic diseases there were 355 deaths, and from consumption, 126.

LOUISIANA.—*New Orleans*, 254,000 : During the five weeks ending November 30th there were 582 deaths, of which 166 were under five years of age. There were 195 deaths in the colored population. Annual death-rate per 1000, 23.91. From zymotic diseases there were 97 deaths, and from consumption, 69.

MARYLAND.—*Baltimore*, 500,343 : During the five weeks ending November 30th, there were 718 deaths, of which 242 were under five years of age. Annual death-rate, 14.93 per 1000. There were 107 deaths from zymotic diseases, and 105 from consumption.

MASSACHUSETTS.—Forty-seventh Annual Report of Births, Marriages, and Deaths, together with the Reports relating to Libels for Divorce and the returns of deaths investigated by the Medical Examiners for the year 1888. A volume of 438 pages, chiefly statistical. Births, 54,893 ; birth-rate, 26.85. Mar-

riages, 19,739 ; marriage-rate, 19.31. Divorces, 624—172 less than during previous year—1 to every 31.6 marriages. Deaths, 42,097 ; estimating the population at 2,044,506, the death-rate was 20.59. The mortality of infants under one year was 8870 —21.07 per cent of the total mortality.

The mortality from prominent zymotic diseases was 6040 : typhoid-fever, 892, more than that of any year since 1882 ; diphtheria, 1351, greater than for any year since 1881 ; croup, 551, less than that of any year of the ten-year period except 1882 ; small-pox, 8.

Deaths from consumption, 5728—13.61 per cent of the total mortality, but less than that of any previous year, and the average rate was 3.2 per 10,000 less than that of the previous ten years.

Medical Examiners' returns : Deaths investigated, 1651 ; percentages : homicide, 3.14 ; suicide, 11.51 ; accident or negligence, 47.55 ; alcoholism, 4.42 ; natural causes, 30.41 ; causes unknown or ill-defined, 2.97.

Boston, 420,000 : Reports for November 702 deaths, of which number 210 were under five years of age. Annual death-rate, 20.05 per 1000. From zymotic diseases there were 105 deaths, and from consumption, 115.

MICHIGAN.—For the month of November, 1889, compared with the preceding month, the reports indicate that tonsillitis, erysipelas, measles, membranous croup, and small-pox increased, and that diarrhœa, remittent-fever, typho-malarial-fever, typhoid-fever, whooping-cough, dysentery, puerperal-fever, cholera morbus, and cholera infantum decreased in prevalence.

Compared with the average for the month of November in the three years, 1886–88, inflammation of bowels, measles, and puerperal-fever were more prevalent, and cerebro-spinal meningitis, cholera infantum, cholera morbus, and typho-malarial-fever were less prevalent in November, 1889.

Including reports by regular observers and others, *diphtheria* was reported present in Michigan in the month of November, 1889, at *sixty-nine* places, *scarlet-fever* at *seventy-one* places, *typhoid-fever* at *eighty-three* places, *measles* at *eighteen* places, and *small-pox* at *two* places.

Reports from all sources show *diphtheria* reported at *nine* places more, *scarlet-fever* at *seventeen* places more, *typhoid-fever* at *thirty* places less, *measles* at *three* places more, and *small-pox* at *two* places more in the month of November, 1889, than in the preceding month.

Detroit, 250,000 : Reports for the month of November 292 deaths, of which 60 were under five years of age. Annual death-rate, 14.21 per 1000. From zymotic diseases there were 100 deaths ; from consumption, 36.

MINNESOTA.—*St. Paul*, 180,000 : Reports for November 166 deaths, of which 66 were under five years of age. Annual death-rate, 11.06, per 1000. From zymotic diseases, 120, and from consumption, 16.

MISSOURI.—*St. Louis*, 450,000 : Reports for November 593 deaths, of which number 188 were under five years of age. Annual rate of mortality, 15.81 per 1000. From zymotic diseases there were 123 deaths, and from consumption, 46.

NEW JERSEY.—*Hudson County*, 282,254 : During the month of November there were 475 deaths, of which number 180 were under five years of age. Annual death-rate, 20.2 per 1000. The deaths from zymotic diseases numbered 108, and from consumption, 51.

Paterson, 85,000 : Reports 107 deaths during November, of which number 45 were under five years of age. Annual death-rate, 15.6 per 1000. There were 16 deaths from zymotic diseases, and 14 from consumption.

NEW YORK.—The *Bulletin* of the State Board of Health for the month of November states that in 125 cities, villages, and large towns, having an aggregate population of 4,012,000, there were during November, 6039 deaths, representing an annual death-rate per 1000 of 18.06. In the infant mortality there is little variation from that of last month. The zymotic death-rate is materially less than that of last month and also than that of November, 1888. This diminution is due to fewer deaths from typhoid-fever, diphtheria, and diarrhœa. Typhoid-fever caused 2.32 per cent of the mortality this month, and

3.24 per cent last month ; about the same variation occurred in 1888. Diphtheria, which increased greatly in October, causing 7.12 per cent of all deaths, has fallen off to 6.86 instead of continuing to increase ; it is reported from but 20 rural towns not enumerated in the *Bulletin*. Diarrhœa shows the customary decrease. There is little variation in other zymotic diseases. In each 1000 deaths there were 129.51 from consumption, and 179.46 per 1000 above five years of age.

New York, 1,571,558 : Total deaths, 2586—836 under five years. Annual death-rate, 20.20. From zymotic diseases there were 321 deaths, and from consumption, 384.

Brooklyn, 821,525 : Total deaths, 1273—404 under five years. Annual death-rate, 17.17. From zymotic diseases there were 203 deaths, and from consumption, 174.

Buffalo, 230,000 : Total deaths (five weeks ending November 30th), 389—154 under five years. Annual death-rate, 17.58. From zymotic diseases there were 58 deaths, and from consumption, 40.

Rochester, 130,000 : Total deaths, 140—41 under five years. Annual death-rate, 12.92. From zymotic diseases there were 10 deaths, and from consumption, 18.

Albany, 103,000 : Total deaths, 152—45 under five years. Annual death-rate, 17.70. From zymotic diseases there were 25 deaths, and from consumption, 14.

Syracuse, 80,000 : Total deaths, 120—27 under five years. Annual death-rate, 18.00. From zymotic diseases there were 13 deaths, and from consumption, 15.

OHIO.—*Cincinnati*, 325,000 : Reports for November 462 deaths, of which 148 were under five years of age. Annual death-rate, 17.05 per 1000. From zymotic diseases there were 103 deaths, and from consumption, 48.

PENNSYLVANIA.—*Philadelphia*, 1,040,245 : Reports for five weeks ending November 30th, 1815 deaths, of which 539 were under five years of age. Annual death-rate, 18.14 per 1000. From the principal zymotic diseases there were 155 deaths, and from consumption, 242.

Pittsburg, 230,000 : Reports for five weeks ending November 30th, 394 deaths, of which 162 were under five years of

age. Annual death-rate, 17.5 per 1000. There were 70 deaths from zymotic diseases, and 26 from consumption.

RHODE ISLAND.—With a single exception, the medical correspondents of the Board, representing every section of the State, report a less than usual amount of general sickness.

Diarrhœal and malarial diseases had decreased about 80 per cent, typhoid-fever about 75 per cent, and acute diseases of the brain about 40 per cent.

Diphtheria and scarlet-fever were reported as present in a few localities only, and in those in sporadic and mild form.

Measles were reported from eight localities, and were largely prevalent or epidemic in West Scituate and Foster, and in the vicinity of Greenville and the villages in the western half of Warwick.

Whooping-cough was prevalent in moderate numbers in Smithfield, Glocester, Foster, and Warwick, and was epidemic in Berkeley.

Bronchitis and catarrhal influenza had increased 100 per cent, and rheumatism 50 per cent compared with the previous month.

Providence, 127,000 : Reports for November 178 deaths, of which number 46 were under five years of age. Annual death-rate, 16.82. From zymotic diseases there were 27 deaths, and from consumption, 24.

TENNESSEE.—The principal diseases, named in the order of their greater prevalence, in the State during November were : *Pneumonia*, *malarial-fevers*, *consumption*, *bronchitis*, *tonsillitis*, and *rheumatism*.

Typhoid-fever is reported in the counties of Campbell, Davidson, Franklin, Grundy, Hamilton, Hawkins, Houston, Knox, Lincoln, McNairy, Rhea, Robertson, Shelby, and Sumner. *Diphtheria* in Campbell, Davidson, Hamilton, Hawkins, Knox, Robertson, and Shelby. *Scarlet-fever* in Franklin, Hawkins, Knox, McNairy, and Shelby. *Mumps* in Bradley, Henry, Lawrence, Robertson, and Wayne. *Measles* in McNairy, Robertson, Shelby, and Sumner. *Croup* in Davidson, Haywood, Knox, Maury, and Shelby. *Whooping-cough* in Davidson. *Varicella* in Grundy.

Chattanooga,	white,	6.22 ;	colored,	24.00 :	12.00
Clarksville,	"	4.80 ;	"	12.00 :	7.50
Knoxville,	"	9.20 ;	"	30.00 :	13.44
Nashville,	"	12.00 ;	"	18.30 :	14.35
Memphis,	"	19.45 ;	"	25.17 :	22.04

WISCONSIN.—*Milwaukee*, 210,000 : Reports 238 deaths in November, of which 110 were under five years of age. Annual death-rate, 13.6 per 1000. From zymotic diseases there were 52 deaths, and from consumption, 16.

THE DANGERS OF OIL LAMPS.—Messrs. S. B. Newbury and W. P. Cutter, of Cornell University, some time ago published an article (which first appeared in the *Scientific American*), upon the question of the safety of modern oil lamps. To determine this the experimenters selected three of the most powerful patterns of lamps now in vogue, including one fitted with a duplex burner, and compared the action of these with that of a lamp carrying a single flat wick one inch in width. So far as could be the same flames were tested with metal and glass bodies. In all cases the temperature of the oil was taken by means of a small thermometer, the bulb of which was immersed to a depth of an inch below the surface of the oil. The lamps were lit for two and one half hours before examination ; and the effect of placing a white shade upon the lamp was also tested.

The result goes to show that the temperature of the oil in a metal lamp is higher by 1° or 2° than that of a glass lamp ; and when a white shade was put upon a metal lamp the temperature of the oil rose in a duplex lamp to 110° F. In a tubular wick lamp, with central air supply, the temperature was 104°. In the common single flat-wick lamp the temperature never rose above 94°. This burner may serve as the type of those generally used a few years ago ; and by comparison with this the increased heat of the more powerful descriptions of lamps is clearly shown. It therefore appears that in various patterns of modern lamps the oil may be dangerously heated ; and that in any case an oil which flashes below 120° is not suitable for use in a high-power lamp.

Drunkenness in England and Wales during the four years from 1885 to 1888, inclusive, according to official returns recently published, show that the total convictions decreased during the first three years, falling from 154,601 in 1885 to 139,482 in 1887. In 1888 there was a rise to 156,809. In Wales the proportion is about one conviction to every 157 of the people. Liverpool had last year 15,000 cases of drunkenness from a population of a little over half a million.

The Louisiana Orange Crop.—Last week we made a visit to the orange belt of our State (lower portion of Plaquemines parish), and found that already considerable progress had been made in gathering that crop. They were being almost altogether taken by luggermen, in bulk in their boats, and most will be packed in barrels in New Orleans and shipped North. The crop is fully one third less than that of last year, on account of the drouth. The prices are fair, although most growers sold the crop last spring, when the trees were in bloom. They did better than others who waited. Ours is a much better market than Florida orange growers have. A "fruit silo" is an excellent idea adopted from Italy into orange-growing countries. The fruit is cut from the tree (not pulled) and wrapped in tissue paper; it is then buried in sand three tiers deep only, and the wrappers not touching. This method has fine results in the preservation of fresh fruit for a time of scarcity.—*Sugar-Bowl.*

Value of Sorghum.—Few plants will yield as much food per acre with so little cultivation as sorghum. I get two hundred gallons of syrup and one thousand pounds fodder, together with as much seed as I can pile on a large two horse-wagon, all from one acre, and that is without any manure. There is no better food for hogs and nothing cheaper. It should be cut and fed green when matured. Every hog-raiser should make two or three plantings at intervals, so that it will not all come at once. It usually comes when hog food is scarce. The seeds make excellent poultry food. I have used them for years, and do not wish anything better for chickens. The fodder, when well cured, I consider equal if not superior to green fodder.—*Mississippi Correspondent of Home and Farm.*

MEDICAL EXCERPT.

PASTEUR'S SUCCESS (?)—The *Journal de Médecine de Paris* has the following remarks on the report of M. Pasteur, in which he gives the statistics of his Institute from November 1st, 1888, to November 1st, 1889; it says: "We do not reproduce here the extraordinary number of the inoculated, nor the praise bestowed on the method by its inventor. We give only the number of deaths admitted by M. Pasteur, of persons who have submitted to his treatment. The number given is *eleven*. If, then, we add to this number that of the deaths which occurred of persons who were not treated, we obtain the annual mean, such as it existed before the celebrated discovery.

"But M. Pasteur is unfortunately badly informed when he tells us that *eleven* persons died after treatment by his method, from November 1st, 1888, to November 1st, 1889. The number is not *eleven*, but *twenty-six*. It would be tiresome to republish here the details of the twenty-six cases, which have already been given in this journal. We have, however, at the service of M. Pasteur and his friends, the names given of the deceased, as well as all the details necessary to elucidate all the scientific points in so important a question.

"We would have been pleased to find in the report of M. Pasteur some explanation regarding the cases of death by paralytic hydrophobia, which, unfortunately, are increasing in a very serious manner, instead of the fulsome praise so pompously bestowed on his method. Our readers will peruse with interest the letter of Dr. Rascol, which we publish in the present number. They will share, no doubt, the uneasiness which many of our professional brethren have felt at the death of the unfortunate postman who, sent by his superiors to the 'Institut Pasteur,' and although not attacked with hydrophobia, returned to his native country to die some weeks after, in consequence of the inoculations in accordance with the method of Pasteur. This case was reported to the Director of the Institute by the physicians of the locality, who asked for an explanation. M. Pasteur has not condescended to give them an answer. We regret this, for we would have been glad to record a scientific explanation of facts which, if they occur

again, will cast the greatest discredit on the method, perhaps not among the public, who are always ill-informed, but among the medical profession, who must, in all cases, be satisfied only with the truth."—*T. P. C.*

TUBERCULOSIS has been the subject of much discussion of late before the Academy of Medicine in Paris. Dr. Hardy, in a report to the Academy, has earnestly protested against certain prophylactic measures prescribed by the commission on tuberculosis. He thinks that cases arising from contagion are very rare, and that alimentary substances are but exceptional causes. Uncooked milk is, in his opinion, very seldom dangerous, and infection can result from the sputa only under certain favorable conditions.

Articles of furniture used by phthisical patients are not dangerous in his opinion. The publicity given to the report of the commission he deems mischievous, because it gives rise, in the minds of the public, to unreasonable fears regarding the danger of contagion from tuberculosis, and the unfortunate sufferers from phthisis will most certainly become the sufferers from the instruction given to the public by the commission.—*Gazette Hebdomadaire. T. P. C.*

LAPAROTOMY FOR GUNSHOT WOUND OF THE ABDOMEN, WITH RECOVERY.—M. Jalaguier has presented to the Academy a very interesting account of a bold operation for a penetrating wound of the abdomen. Laparotomy was performed almost immediately after the injury, in the case of a woman who shot herself with a revolver in the epigrastric region. The general condition of the patient was very serious. She was in a state of coma, and it was certain that the stomach had been perforated, and that the peritoneal cavity was filled with gas. The correctness of the diagnosis was verified by the operation. The wound in the stomach was closed with sutures, and the patient recovered. The wound was near the lesser curvature, and was accompanied with hæmorrhage of the coronary artery of the stomach.—*Gazette Hebdomadaire. T. P. C.*

SALOL AS AN ANTISEPTIC.—M. Dreyfus has found salol an efficacious antiseptic for the urinary organs, and has found it

very useful in cases of blennorrhagia. By the use of salol the urine becomes a therapeutic agent for the kidneys, for the mucous membrane of the bladder, and for the urethral canal. He gives from 7 to 8 grammes—105 to 120 grains—daily. In the treatment of blennorrhagia he has found it useful to add copaiba or cubebs to the salol. M. Dreyfus thinks it would be advisable to give salol to all patients on whom operations have been performed on the urinary organs, and in cases of lesions which might give rise to infection.—*Gazette Hebdomadaire. T. P. C.*

Ammonia in Cocaine Poisoning.—A case of poisoning by a very moderate quantity of cocaine is reported by Dr. Golovkoff, in the Proceedings of the Caucasian Medical Society, where ammonia was used with good effect to restore the patient. The patient was a somewhat delicate woman, who was suffering severely from toothache. The pain becoming unbearable, Dr. Golovkoff injected fifteen minims of a two-per-cent solution of hydrochlorate of cocaine under the skin of the left cheek, which gave relief for three or four hours, when the pain returned as acutely as ever. A second fifteen minims were injected, and in about five minutes' time the patient became restless, her pupils dilated, the surface of the skin became pale, the pulse and likewise the respiration became rapid, and shivering came on. A curious effect, too, was produced on the sounds of the heart, causing them to be audible at the distance of two paces from the patient. There was great pain over the cardiac region and back, together with a dread of death and convulsive movements of the limbs. There was some liquor ammoniæ at hand, and this the patient was given to smell, and a few drops were given internally every five or ten minutes. Amyl nitrite was also employed, but the latter seemed to do more harm than good, while the ammonia soon brought the pulse and respiration, and indeed the general condition of the patient, into something more like their natural condition, so that in about a couple of hours she had quite recovered.—*Lancet, November 30th*, 1889.

The Effect of Ventilation on the Micro-organisms Suspended in the Air.—From experiments conducted in

the hygienic institute at Breslau, R. Stearn found that when the air of a room was undisturbed the particles of dust containing micro-organisms were deposited on the floor of the room, and that after one to two hours the air was almost free of germs. If the floor was then washed with an antiseptic solution and the furniture wiped with a dampened cloth that the room could be considered as disinfected. That ventilation sufficient to change the air contained in the room, four times an hour, had but slight influence on the removal of the germs floating in the air, but that a draught of air sufficient to change the quantity seven times an hour, accomplished this quickly and completely. That stronger draughts did not dislodge germs from the floor, carpets, furniture, or clothing, and that the airing of infected clothing, bedding, carpets, etc., was useless unless accompanied by beating and brushing of the same, which in its turn, in the case of pathogenic organisms, would be hazardous. Zeitschrift für Hygiene, 1889, Bd. vii., abstracted in Centralblatt für Chirurg., 1889, No. 47. W. V.—*Medical Analectic.*

Ether, Chloroform, Nitrous-Oxide Gas and Ether.—An anonymous physician thus writes to the *Lancet*, December 7th, 1889: "On six different occasions within the past ten years I have unfortunately required the administration of one or other of the above-mentioned anæsthetics. My initial experience was with ether, which was given me in a towel formed into a cone with a sponge at the top. After getting over the choking in the first, and on passing into the second stage, I became so violently delirious that it required the utmost efforts of three strong men to restrain me. I may say that I am a powerful man, and was at the time in training for boxing. The after-effects—sickness, nausea, and general misery—I did not get over for quite forty-eight hours. My next experience was with chloroform, which I have had in all four times. It was administered on each occasion through a Junker's inhaler. I quickly went under and as quickly came to; but the nausea, which lasted from thirty-six to forty-eight hours, was very trying, and exhausted me a good deal. Quite recently I have had to seek the services of a surgeon at another hospital; and when informed in the theatre that it was intended to give me ether,

I must say that I dreaded the anæsthetic much more than the surgeon's knife. I was first given nitrous-oxide gas to produce insensibility, and then ether was substituted. Altogether, I was twenty minutes inhaling the latter. Within a few minutes of removing the ether I was able to answer questions, although I did not fully recover consciousness until removed to my ward, and within an hour I was entirely free from all unpleasant effects of the anæsthetic, and able to partake freely of bread and milk. I may add that on each occasion I was prepared *secundum artem* for the reception of the drug, and the time of inhaling lasted about the same—viz., twenty minutes."
—*Medical Analectic.*

Albuminuria and Life Insurance.—The *Journal de Médecine de Paris* gives a communication from M. Pavy on the prognosis to be made in the special cases of applicants for life insurance. As insurance companies do not accept applicants who, on examination, are found to have albumen in the urine, it is very important that the doctor should examine such applicants with the greatest care, as there is often undue importance attached to small quantities of albumen.

M. Pavy thinks that albumen following excessive exercise, after an attack of cold, after the use of certain kinds of food, are only transient cases, and consequently ought not to prevent the applicant from acceptance by the insurance company.

Along with these cases of albuminuria should be placed those intermittent cases in which the prognosis is always favorable.

Again, in chronic cases a distinction should be made between those in which only traces of albumen are found, and especially if no other symptom of Bright's disease exists, and the cases in which the quantity of albumen present is great and accompanied with œdema of the limbs, etc. Only those cases of confirmed Bright's should be excluded by life insurance companies.

It is, therefore, a great injustice to the applicant to reject those cases in which the albumen in the urine is only tranesitn.

Potatoes as a Substitute for Laparotomy.—Dr. Cameron, of Glasgow, has used this plan of treatment in several

cases of ingestion of large foreign bodies with good success. Dr. Salzer, of Vienna, has also had an opportunity to try this method upon a boy who had swallowed a brass weight of twenty grammes. Potatoes were fed to the boy, cooked in a variety of ways, to encourage his appetite, which he took willingly. After five days the brass weight was compelled to retreat, overwhelmed by the constant accessions of reinforcements from above, and passed out, leaving the potatoes in possession of the field. In the same manner he treated ingestion of a set of artificial teeth, and also a scarf pin. Dr. Salzer believes that this form of treatment will subserve a useful purpose in many cases in which, up to the present time, gastrotomy appeared to be the only form of relief available. Dr. Hochenegg treated the case of a boy who had swallowed a nail, and had been treated by gastrotomy, some years before, with the potato cure.

Dr. Billroth considers laparotomy as very uncertain for the removal of foreign bodies, and strongly favors the potato cure.

THE CHANCES FOR GETTING PURE DRUGS.—The report of the New York Analyst of Drugs shows that the chances for getting drugs of good quality on prescription is 43.8 per cent ; fair, 17.4 ; inferior, 26 ; not as called for, 11.6 ; excessive strength, 1.2.—*Times and Register*, Philadelphia, December 7th, 1889.

Charles Chadwick, Ottis R. Wyeth, Louis A. Schoen, George J. Schoen, Charles F. Hermann, George Eyesell, and Horace L. Roy, druggists of Kansas City, Mo., were recently fined $500 each and costs for counterfeiting a preparation known as Bromidia.—*Journal of the American Medical Association*, Chicago, November 16th, 1889.

THE HAHNEMANNIAN DOCTRINE OF INCREASING POTENCY with increasing attenuation has been ingeniously applied by the professors of the mind cure to their science, and one of them explains the working of their treatment as follows : "I have found by actual experiment that as the drug is attenuated its power is increased, until, when the drug is all gone and there is only mind, its greatest efficacy is reached."—*New York Medical Times.*

LITERARY NOTICES.

FIVE YEARS IN PANAMA, THE TRANS-ISTHMIAN CANAL. By WOLFRED NELSON, M.D., Corresponding Member of the Natural History Society, Montreal. 12mo, pp. 300; illustrated. New York: Belford Company, 18–22 East Eighteenth Street.

This is an unusually interesting book comprising the natural history, products, artificial changes, ruins, climate, and excavations of the Isthmus of Panama, in the midst of the greatest undertaking of engineering enterprise of modern times. The author—an observant physician of excellent English education, and also familiar with the Spanish and French languages; a trained newspaper correspondent, accustomed to a quick comprehension of everything about him and with freedom of access to all his surroundings—gives just what should be expected of him: a concise description of that which he has seen with such logical conclusions—in regard to the De Lesseps enterprise—as are justified by a thoroughly intelligent and close observer. But besides all this, which will not fail to interest a multitude of readers whose first, and perhaps only interest, has been in the possibilities of the canal, many profitable lessons may be learned from the social aspects of the people there collected together—the natives, Chinese, and negroes—and how their diseases have been encouraged by the neglect of preventive measures.

There is in this aspect of the sketch one of the best examples of a thorough cultivation of a wilful disregard of human life that has ever fallen under our observation.

The book closes with an estimated cost of the excavations in dollars—$168,600,000; in human life?

WOOD'S MEDICAL AND SURGICAL MONOGRAPHS, *December* number: "A Practical Treatise on Baldness," by George T. Jackson, M.D.; "Sphere, Rights, and Obligations of Medical Experts," by James J. O'Dea, M.D.; "Pathology and Treatment of Ringworm," by George Thin, M.D.; "Notes

on Dental Surgery," by J. Smith, M.D. ; " Sounding for Gall-Stones, and the Extrusion of Gall-Stones by Digital Manipulation," by Dr. George Harley, F.R.S.

It might go without saying that each one of these essays is of importance to every medical practitioner, that they are on subjects of continuous recurrence, and that, moreover, they are by recognized authorities. Published monthly, $10 a year ; $1 a number. New York : William Wood & Co.

FOODS FOR THE FAT : A TREATISE ON CORPULENCY AND A DIETARY FOR ITS CURE. By NATHANIEL EDWARDS DAVIES, Member of the Royal College of Surgeons, England. American edition, edited by Charles W. Green, M.A. 12mo, pp. 140 ; price, 75 cents. Philadelphia : J. B. Lippincott & Co.

This is a good book on food and diet generally, although written with reference to special conditions. It avoids the extremes of Banting, Oertel, and others as being more likely to do harm than good, and submits such bills of fare as may well be used in warm weather and warm climates, particularly, in the promotion of health, independent of any special indications by reason of excessive fat, while those for whom it is specially intended may profit by it without risk to health.

ESSAY ON PNEUMATOLOGY—OXYGEN AND OTHER GASES IN MEDICINE AND SURGERY : A PHYSIOLOGICAL, CLINICAL, AND THERAPEUTIC INVESTIGATION OF THE GASES. By J. N. DEMARQUAY, Surgeon to the Municipal Hospital, Paris, and of the Council of State ; Member of the Imperial Society of Surgery, etc. Translated, with Notes and Additions, by Samuel S. Wallian, A.M., M.D., Member of American Medical Association ; ex-President of the Medical Association of Northern New York ; Member of New York County Medical Society. 8vo, pp. 315 ; illustrated. Price, $2. F. A. Davis, 1231 Filbert Street, Philadelphia.

Prefatorily the author says this work has nothing in common with the " Essay on Pneumatology," by Combalusier, published in 1747, except in title. His object, as stated by himself, " has been to study those diseases in which the gases

play a certain *rôle*, as the pneumatoses and the emphysemas, and to study the applications which may be made of the gases in therapeutics." The work is divided into two parts: the first, physiological and pathological; the second, physiological and therapeutic.

Oxygen inhalation is virtually *the* subject of the book. It has been before the profession for about twenty years, the translator of the work under consideration being the first in this country, he says, so far as he can learn, to have written upon it, contributed to the Chicago *Medical Journal*, February and March, 1869. It has made slow progress, and its use has been almost wholly limited to certain non-febrile forms of phthisis and asthma, as advised by Combalusier and Demarquay long ago. But besides reproducing most that these authors wrote, the additions, notes, and comments of the translator comprise a large number of well-authenticated cases and conditions—surgical as well as medical—in which it appears to have been used with such benefit as to fully justify this substantial presentation of the subject to the attention of the medical profession, to whom we commend it.

ESSENTIALS OF MATERIA-MEDICA, THERAPEUTICS, AND PRESCRIPTION WRITING, ARRANGED IN THE FORM OF QUESTIONS AND ANSWERS, PREPARED ESPECIALLY FOR STUDENTS OF MEDICINE. By HENRY MORRIS, M.D., Late Demonstrator, Jefferson Medical College, Philadelphia; Co-editor of Biddle's Materia-Medica, etc. 12mo, pp. 260. Philadelphia: W. B. Saunders, 913 Walnut Street.

A well-arranged quiz-book comprising the most important recent remedies.

THE INTERNATIONAL MEDICAL ANNUAL (for 1890), the eighth yearly issue, is announced for early delivery. The Prospectus gives promise of excellencies surpassing all former editions.

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WHO WAS YOUR GREAT-GRANDFATHER? The Detroit *Journal* desires to receive, by postal card, the address of all living male and female descendants of Revolutionary officers and soldiers of 1776, and, when possible, the name and State of the ancestor. The purpose we have in view is strictly legitimate. The Detroit Journal Company, Detroit, Mich.

PAMPHLETS, REPRINTS, REPORTS, ETC., RECEIVED.

"The Whistle Signal: A Plea for the More Safe Management of Railroads." Robert Barclay, A.M., M.D., St. Louis, Mo.

"Highway Improvement." Colonel A. A. Pope, Boston.

"Personal Observations of Leprosy in Mexico and the Sandwich Islands." Prince A. Morrow, M.D., New York.

"Tuberculosis Papillomatosa Cutis." Prince A. Morrow, A.M., M.D., New York.

"On a Saw-Fly Borer in Wheat;"

"Deterioration of Farm-yard Manure by Leaching and Fermentation;"

"Effect of a Grain Ration for Cows at Pasture:"

Bulletins, Agricultural Experiment Station, Cornell University, Ithaca, N. Y.

"Mechanical Dysmenorrhœa." William Goodell, M.D., Philadelphia.

"The Pine Belt of New Jersey." Isaac Hull Platt, M.D., Lakewood, N. J.

"The Art of Cooking." Edward Atkinson, LL.D., Boston, Mass.

"Relations of Quarantine to Commerce in the Valley of the Mississippi River, with Observations upon the General Mortality of New Orleans." Joseph Jones, M.D., New Orleans, La.

"A Study of Windbreaks in Their Relation to Fruit Growing." Cornell University, College of Agriculture, Ithaca, N. Y.

"Proceedings and Addresses at Sanitary Conventions," held at Otsego, May 2d–3d, Tecumseh, June 6th–7th, and Ludington, July 11th–12th, 1889. Secretary of State Board of Health, Lansing, Mich.

"Circulation or Stagnation," and "The General History of Principles of Sanitation." Sir Edwin Chadwick. Cassell & Co., New York.

"Physiological Factor in Selecting a Climate for Invalids." E. O. Otis, M.D., Boston, Mass.

"Domestic Economy in Public Education." Mrs. Ellen H. Richards, Instructor in Sanitary Chemistry, etc., Educational Monographs, $1 a year. New York: 9 University Place.

"Tomato Culture." Bulletin X., Agricultural Experiment Station, Cornell University, Ithaca, N. Y.

"Injuries to the Skull." Thomas H. Manley, M.D., 302 West Fifty-third Street, New York.

"Studies of Intestinal Surgery." William R. Vandennep, A.M., M.D., Philadelphia, Pa.

"Buckeye Portland Cement." Buckeye Portland Cement Co., Bellefontaine, O.

"Clinical Observations on Some of the Effects of Direct and Indirect Traumatism of the Brain." R. Harvey Reed, M.D., Mansfield, O.

"Some of the Relations of Humane Societies to Institutions Having the Care of Children." E. V. Stoddard, M.D., Rochester, N. Y.

"Responsibilities and Duties of the Medical Profession Regarding Alcoholic and Opium Inebriety;" "Cirrhosis of the Pancreas;" "Cephalæmatoma of the New-born;" "Retained Débris as One of the Causes of Puerperal Fever;" "Influence of Sewerage and Water Pollution on the Prevalence and Severity of Diphtheria;" "Treatment of Puerperal Fever;" "Observations in Vienna." Charles Warrington Earle, A.M., M.D., Chicago, Ill.

"Report of Three Interesting Cases, viz., Adenoid of the Vault of the Pharynx; Strumous Ozœna; Tubercular Phthisis." Sidney Allen Fox, M.D., New York.

"Climate of Southern California in Its Relation to Renal Diseases." P. C. Remindino, M.D., San Diego, Cal.

"Practical Notes on Urinary Analysis." William B. Canfield, A.M., M.D., Baltimore, Md.

"Training School for Nurses." Post-Graduate Medical School, New York.

"Treatment of Suppurative Disease of the Uterine Appendages." H. J. Boldt, M.D., New York.

"Dress Reform and Its Relation to Medicine." S. Knopf, M.D., Los Angeles, Cal.

"In Defence of Russia and Its Treatment. An Answer to Mr. George Kennan's Articles on Siberia in the *Century*." Colonel Charles de Arnaud, Washington, D. C.

"Electric Tabulating System." H. Holerith, Washington, D. C.

"Manual Treatment in Gynæcology." H. J. Boldt, M.D., New York.

"Healing of Aseptic Bone Cavities by Implantation of Antiseptic Decalcified Bone." N. Senn, M.D., Ph.D., Milwaukee, Wis.

"Open-Air Travel as a Cure and Preventive of Consumption." Henry J. Bowditch, Boston, Mass.

STATISTICS OF LEPROSY IN THE UNITED STATES.—In view of the general impression that leprosy is spreading in this country, it is desirable, in the interest of the public health, to obtain accurate information on this point. The undersigned is engaged in collecting statistics of all cases of leprosy in the United States, and he would ask members of the profession to aid in this work by sending a report of any case or cases under their observation, or coming within their knowledge.

Please give location, age, sex, and nationality of the patient, and the form of the disease—tubercular or anæsthetic; also any facts bearing upon the question of contagion and heredity.

Address Dr. Prince A. Morrow, *Journal of Cutaneous and Genito-Urinary Diseases*, 66 West Fortieth Street, New York.

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MEDICAL AND VITAL STATISTICS.*

By JOHN S. BILLINGS, A.M., M.D., LL.D., U. S. Army.

I PROPOSE in these lectures to speak of vital and medical statistics, and of some of their relations to each other and to scientific and practical medicine and sanitation. The discussion will include such points as, character of the data required, methods of obtaining them by the census, by registration, and in other ways; relations of physicians to this kind of work, methods of compilation and forms of publication, the best existing sources of such data, and some of the more common fallacies in drawing conclusions from the data as ordinarily published.

These and other points will be considered in their practical applications to certain questions which I hope may be of interest to you, as, for example: Is the average longevity of man in civilized countries increasing? What data are required to judge practically of the relative healthfulness of different localities, or of the same locality at different times? What are the relations of certain forms of disease to race, to climate, to locality, to occupation? What is the relative tendency to increase of population in this country in the white and colored races? What is the statistical evidence with regard to improvement in practical therapeutics as derived from hospital data, from death-rates in obstetric practice, etc.?

Circumstances have made it necessary for me to endeavor to ascertain the character and amount of the statistical data which have been published, and which are available for those who wish

* Abstract of the Cartwright Lectures, delivered before the Alumni Association of the College of Physicians of New York, November, 1889. Lecture I.

to make special studies of the relative frequency of certain diseases, deformities, or disabilities ; of their causes and results, especially as to mortality ; or of the relations which exist between disease and death, and such conditions as sex, age, race, soil, climate, occupation, etc., and in the course of this investigation it has seemed to me that many physicians are not as familiar with statistical methods and with existing sources of information relating to vital statistics as it is desirable that they should be to enable them to judge properly the value of the arguments and conclusions presented by those who make use of such data, even though they themselves may have no desire or intention to use statistical methods of research.

There are many fallacies and errors connected with vital and medical statistics as ordinarily collected and used, and it is highly desirable that the physician should be aware of the more important of these, since he is constantly appealed to for decisions as to their true significance and value. "It is as easy to tell lies with figures as with words, and bigger ones ;" but while we ocasionally meet with deliberate falsifications of the records, made for the purpose of magnifying or diminishing the apparent mortality or prevalence of a particular disease in a given locality, or to maintain an anti-vaccination thesis, these are not so frequent as are the errors of involuntary misstatement and misinterpretation into which those not familiar with methods of collecting and tabulating statistics are so liable to fall.

My experience with those seeking statistical data is, that the majority begin by looking for data which are in favor of some particular conclusion with which they commence, rather than by selecting data with reference to their probable completeness and accuracy, and accepting the conclusions which may be legitimately drawn from them, whatever they may be.

Those who are engaged in the collection and compilation of official mortality and vital statistics are often at first the most sceptical as to their accuracy and utility, for their attention is so frequently and forcibly drawn to errors in the individual data that they conclude that the whole mass is unreliable, and the difficulties in the way of obtaining complete and reliable figures are seen to be so great that they incline to give up the whole matter in despair. Continued study of the subject,

however, shows that many valuable conclusions or suggestions can be derived from imperfect data, and that in large masses of figures the errors either tend to neutralize each other, or to produce a constant effect in one direction which can be calculated and allowed for, so that those who have had the greatest experience are most convinced of their value. It is true that, in statistics, the inferences cannot be more accurate than the data on which they are founded, but we do not look for scientific exactness from them so much as for an estimate of probabilities.

The methods which we have for advancing our knowledge of the laws of human life, of the causes of abnormity, disease, and death in man, and of means of sanitation or therapeutics, may be grouped into two classes—viz., observation and experiment, which, however, are often combined.

In the experimental method we seek to make a direct test of the variation of one particular condition, or set of conditions, upon the living organism, all other conditions being kept uniform as far as possible. Some such experiments can be made on man, but the greatest number of the problems which we may hope to solve by this method, and among these the most important, can only be approached by experiments on the lower animals. Within the last twenty years, experimental physiology and pathology have made great advances, and these methods, so far as they are applicable, give more definite results, and are more immediately satisfactory, than those derived from comparison of observations in which no definite experimental variations have been made ; but so far as regards causes of disease, or the action of supposed methods of prevention, or of remedies, it is unfortunately the case that we cannot draw accurate conclusions as to what will happen in man from what is observed to happen in animals. In the first place, there are many important forms of disease in man which cannot, with our present knowledge, be experimentally produced in animals, and which rarely or never occur in them.

For example : Yellow-fever is a disease which, from analogy, we have every reason to believe is due to the action of one or more specific micro-organisms, or, perhaps, I should say, to the products of such organisms. We find a dozen different kinds of bacteria in persons suffering from yellow-fever, and,

by dint of much labor, these have been isolated and cultivated outside the human body. The problem is to determine positively, and with scientific precision, which, if any, of these is the true essential cause of the disease. The mode of doing this is by producing the disease in a perfectly healthy person or animal by the inoculation of the suspected organism. But, thus far, we have failed to find any animal in which a disease, which can be considered as specifically identical with yellow-fever, can be produced by any method ; and I need hardly tell you that inoculations of such a disease as this in a human subject, under conditions which would make the results of such inoculation scientifically trustworthy, are impracticable and unjustifiable.

Those forms of disease which are common to animals and man, such, for instance, as anthrax, tuberculosis, tetanus, hydrophobia, the ordinary forms of suppuration, and, possibly, also typhoid-fever, are being pretty thoroughly worked out by means of such experimental inoculations as I have just referred to ; and we are able to say, with a great degree of precision, not only that these diseases are due to specific forms of bacteria, but to determine enough of the characteristics of these forms to be able to identify them wherever they are found.

For the great majority of diseases, however, this experimental method of determining the causes, and, therefore, necessarily, experimental methods of prevention and treatment, cannot be employed in such a way as to isolate distinctly the effect of the particular agent or circumstance which we are investigating, and we must therefore resort to the other mode of advance of knowledge which has been referred to—namely, that of observing the phenomena as they occur in man, and endeavoring so to group the results of these observations as to determine the influence of a particular condition or set of conditions while all other circumstances remain uniform.

This method of observation may, for our purposes, be again divided into two categories. The first is that which is used in individual cases, being the form applied by the physician to each case which he has to treat. It also includes the sort of investigation which may be made in a single household, a small community, or a thinly populated district to determine the course and cause of a particular form of endemic or epidemic

disease, where the conditions affecting each family or dwelling can be studied in detail. By the combination and comparison of detailed studies of this kind, the greater part of our present system of diagnosis, prognosis, and therapeutics has been evolved ; but it has been and will be a slow process, for each man differs from every other man in structure and mode of function, and the conditions of the environment are so multiform, and so variable in space and time, that "experience is doubtful, and judgment difficult." We must, therefore, try to supplement the information thus obtained by that derived from the second kind of observation above referred to—namely, that of collecting a few data with regard to great numbers of people, especially where these are accumulated in thickly-settled localities, forming what is called the statistical method as applied to different communities. By the first method we compare individual with individual, and do so with considerable minuteness of subdivision of the conditions studied ; by the second method we compare the vital phenomena of communities with those of other communities, but only on broad lines and in relation to circumstances easily noted.

The object of vital statistics is to classify and arrange the facts relating to the quantity and character of human life under different circumstances, for the purpose of determining the effect upon it of each of these circumstances taken singly, or of two or more of them acting together. The results thus obtained form an important part of the scientific foundations of sociology, of political economy, and of preventive medicine. It deals with masses of men and not with individuals, and its conclusions are, for the most part, applicable only to large bodies of people ; yet its data are derived from individual records, and its results are accepted in many cases as a sufficient guide for individual action. They do not, in this respect, differ essentially from most of the motives which actuate us in daily life. The farmer sows his seed, the manufacturer builds his mills, the physician writes his prescriptions, and you come to hear this lecture from motives of probability, not carefully formulated in most cases or capable of expression by a formula, but, nevertheless, in accordance with the doctrine of chances as determined by previous experience.

The term "vital statistics," in the sense in which I use it in

these lectures, corresponds almost precisely to the French term "demographie" or the German "demologie," being applied to the circumstance of human life only in the sense of Korosi's definition that it is the science of the physical life of human society. We will first consider briefly the sources of information and the character of the original data available for this study; second, the methods of arranging and using these data; and, third, the value and applicability of some of the conclusions which may be drawn from them, especially in that branch known as medical statistics.

The essential data of vital statistics are derived from enumerations of the living population and from records of births, marriages, and deaths.

The numbering of the people is effected by a census, a term derived from the Roman Censors, a part of whose duty was to make such counts. Such enumerations were made by Moses (1490 B.C.), David (1017 B.C.), in Greece, 650 B.C., and in Rome beginning 566 B.C. In modern times the first country to make a count was Sweden in 1749. The first census in the United States was taken in 1790 as a necessary means of carrying out the constitutional provision that the basis of representation for the several States should be the number of the population in each. The first census in England was taken in 1801, and showed the number of persons, with distinction of sex, the number of houses, the number of families, and a rough statement of occupations under the general classification of agriculture, trade, manufactures or handicraft, and all others.

The first satisfactory English census, giving distinction of age, sex, occupation, and birthplace, the number of persons blind and deaf and dumb, was the census of 1851. This was the first census whose data could be used in connection with the general system of registration of births and deaths.

The first attempts to take a census in a country have usually excited more or less suspicion and opposition, from fear that the information obtained would be in some way used to oppress the people. For example, several attempts to take a census have been made in Hayti, but have always given rise to insurrection, and have always been defeated, owing to the belief of the people that it would in some way lead to their losing their liberty.

In the first censuses the object was to determine the number liable for military service or qualified to vote, or to fix rates of taxation, and the records were very brief. In the first United States census the only data called for on the schedules were, names of heads of families, free white males over sixteen, free white males under sixteen, free white females, all other free persons, and slaves.

The record of age was first made in the English census in 1821, was omitted in 1831, and resumed in 1841. As the census records came to be more and more relied upon as a basis for legislation, additional details were introduced, until at the present time we have such records from some of the principal countries of the world.

The relative importance of each of these details in studies of vital statistics varies greatly according to the purpose to which they are to be applied ; but to physicians, sanitarians, and those interested in life insurance, the dominating factors are age, sex, and race. The power of reproduction, the tendency to death, and the liability to certain forms of disease, vary greatly at different ages of the two sexes, and this gives rise to corresponding variations in the disease and death-rates of populations of different localities, or of the same locality at different times, when those populations differ as to the relative proportion of young and old or of male and female which they contain. These variations we must ascertain if possible, and estimate the influence of, in order to make reliable and useful studies of the effects upon human life of climate, altitude, race, occupation, or other conditions of the environment. In the course of these lectures I shall often have occasion to refer to this dominating influence of age, and to point out errors due to neglect of this factor, which is by no means an easy one to determine for many places at many times. Even the ceusus data require corrections, since people do not give their ages accurately to the enumerators. The tendency is to answer in round numbers, as 20, 30, 40, etc., and to a less but still marked extent, as 25, 35, 45, etc. ; but the effect of this can be done away with to a considerable extent by properly grouping the individual data, as I shall explain presently. Ages over 90 are largely overstated, and the ages of women between 25 and 50 are largely understated ;

but those errors being comparatively constant, and influencing the data of all communities, do not lead to erroneous conclusions of importance in comparing different communities, if the distinction of sex be observed.

One of the most interesting fields of study in vital statistics is the relation of race and color to birth-rate, to certain forms of disease, or to the liability of death at certain ages.

This country is, as you know, the great mixing ground for different races of the human family, and, while the mixture is rapidly becoming so intricate as to make it impossible to distinguish the several strains, it is still true that there are large groups of men of quite distinct races, the record of disease and death in which would form valuable material for study upon this point were it possible to collect them.

From the sociological and political point of view this is particularly the case with regard to the negro and to those having a mixture of negro blood ; and in the Southern States such questions as the following are of great practical interest : Is the negro population increasing faster than the white ? Is the proportion of mixed bloods, such as mulattoes, quadroons, etc., increasing in proportion to the general population ? Are the fertility and expectation of life of mixed bloods greater or less than those of pure whites or pure blacks under the same circumstances of environment ? We will return to these questions hereafter ; at present I merely refer to them as being the probable reason for the introduction into the law for taking the next census of a special clause providing " that the population schedule shall include an inquiry as to the number of negroes, mulattoes, quadroons, and octoroons," an attempt to obtain information which has not heretofore been sought in this way. In obtaining the records of deaths occurring during the census year beginning June 1st, 1889, an effort will be made to have the deaths of colored persons distinguished into those of pure negroes and those of mixed blood. It will probably be impossible to obtain the data for either living population or deaths with the minuteness of subdivision indicated by the words " mulatto," " quadroon," and " octoroon ;" but there is reason to hope that in many sections of the country we shall be able to distinguish those of mixed blood from the pure blacks and the pure whites, and to give some opinion

with regard to their diseases and death-rates. The results of the last census, although imperfect, show such marked differences as regards the mortality from certain diseases, not only between the whites and the blacks, but between those of English, Irish, and German descent, as to make it certain that it will be worth while to pursue this branch of inquiry more minutely as opportunity is offered to us hereafter.

The influence of race upon mortality is specially manifest in the death-rates of cancer. The number of deaths from cancer per 100,000 population in certain portions of the United States, with distinction of white and colored, was as follows :

White.	Colored.
27.96	12.67

In the northern part of the United States the proportion of deaths from cancer in proportion to 1000 deaths from known causes, with distinction of white, colored, Irish and German parentage, was as follows :

White.	Colored.	Irish parentage.	German parentage.
19.1	7.8	24.3	25.8

It will be seen from these that the liability to death from cancer is not half as great among the colored people as it is among the whites, and that there is a greater tendency to death from cancer in persons of German parentage than in all the average white population, especially between the ages of fifteen and sixty-five.

The relation of race to vital phenomena in general, and to disease and death-rates in particular, forms one of the most interesting branches of what Galton calls the "science of heredity," but it is a branch in which little progress has been made, and for the study of which the United States offers greater opportunities than any other country. "The question of race influence is not merely an abstract matter fitted only for well-rounded periods in the discussions of the schools, but it profoundly affects vital and national life." It is a force which acts incessantly upon and menaces us, and, so far as we can now see, it is mainly upon the outcome of the distribution and prevalence of race that depend civilization, religion, and the future of man upon the earth. In so far as the conditions of things tend to preserve the best types, progress is favored.

In so far as they tend to destroy or to debase them with inferior types, progress is hindered. Not every mixture of race prevails, or persists, but there has been a certain amount of mixture wherever there has been progress in human affairs. Such mixture appears to have been a consequence rather than a cause, yet it may become an important secondary cause in changing or modifying the course of human events.

The census gives us a view of the population on a certain day, and if well taken and properly applied it gives a general view of the stream of life as it flows on that day, with its variations of breadth and depth, from which it is possible to calculate, within certain limits, the velocity of the current, the rapidity of change, and the probable rate of increase or decrease, especially if comparisons can be made with the results of a previous census taken in the same way. It may also indicate periods of widespread disaster or of migration.

The proportions of the living population in 1880 show that the decrease in the number living at each quinquennial group of ages was tolerably regular for the whole population for the native-born whites and for the colored as we proceed from the lower to the higher ages, as it should be under ordinary circumstances; but that there is one marked exception for the age-group 15 to 20, in which the line makes a sudden angle, indicating a relative deficiency in the number of persons living at this age.

It will be observed also that the age-group in which there is the largest proportion of the foreign-born population is that from 35 to 40.

Comparing these figures with those of the census of 1870, we find that this peculiar deficiency in the age-group, and the maximum proportion for foreign-born occur in those age-groups which precede by ten years the groups in which they occurred in 1880. The break or step in the descending line is in the age-group 5 to 10, instead of that 15 to 20, and the maximum proportion of the foreign-born is in the age-group 25 to 30, instead of that 35 to 40. Now if we go back between five and ten years from the census of 1870, to see what special cause existed in that period for a diminution in the number of births, we find ourselves in the period of our Civil War. These breaks or angles, then, are the scars of one of the wounds which the

war inflicted. The shifting of the maximum point in the line of the foreign-born population indicates the unusually great immigration of Irish and German families containing young children, which occurred between 1850 and 1860, forming a wave whose crest is still perceptible. It is safe to predict that in the census of 1890 the break or step showing a deficiency in births will be shifted forward to the age-group 25 to 30, and that the maximum proportion of the foreign-born will be in the group 45 to 50.

In general, however, we may say that the census indicates the state of the population at a given period. Vital statistics, however, consider both the state and the movement of the population, and, therefore, for these we must have something more than the census—viz. : a record of the deaths and births occurring in successive period, from which we can compute mortality and natal rates.

Mortality, or mortality rate, refers to a ratio between the number of deaths occurring and the number of living population furnishing those deaths. It is to be distinguished from a statement of the number of deaths, since to determine the mortality in a given population, we must not only know the number of deaths, but also the population furnishing that number. This may be expressed in the following formula : $M = \frac{D}{P.}$

In the same way natality does not mean the number of births, but it means the ratio of the number of births to the population in which they occur : $N = \frac{B}{P.}$

The relations between mortality and natality are very important, as I shall have occasion to explain hereafter. The value of such statistics depends, of course, on the accuracy of the individual data and the completeness with which these data are gathered for the given locality to which they relate.

Accurate data with regard to deaths can only be obtained by a system of registration of deaths made at the time they occur. Repeated experience has shown that it is utterly impossible to collect, at the end of a year, by any mechanism of enumeration, more than 70 per cent of the deaths which have

occurred during the preceding year ; and it is now well recognized that a complete registration of deaths can only be secured by legislation which forbids a burial until a permit has been granted from a central office, which permit is issued only on the certificate of a physician, setting forth the cause of death and other facts connected with it which are of importance, and which will presently be referred to. In the great majority of cases it is comparatively easy to enforce the law, even in thinly settled rural districts, and the community soon learns to consider any attempt at burial without a permit as a suspicious circumstance, indicating a desire to conceal either the death or the cause of death, and justifying a special investigation by the authorities. When it has been decided to require a burial permit in all cases, it is not usually difficult to require the data for registration as an indispensable preliminary to the issuing of such permit.

Any system which depends upon the returns of undertakers for a record of deaths gives incomplete and unsatisfactory results. It is only where the permit must be obtained before burial, and the certificate must be filed at a central office before the permit is issued, that a complete record of all deaths will be obtained. Any complete system of death registration should include some method of verification of the death and of its cause, which must be certified to by some person having the special knowledge which alone can enable him to give such a certificate.

In the first place, we must have this verification to insure the fact of a death having taken place. In its absence, in a large city, there is little or no difficulty in having recorded the death of a person who may be either alive and well, or non-existent, and the door is thus opened to frauds of various kinds, some of which have actually been attempted and discovered, while others, no doubt, have been successful and remain still unknown. Such verification is also necessary to insure the fact of real as opposed to apparent death in any case, and thus prevent premature burial.

The utility for this latter purpose is, of course, small, for the popular idea as to the frequency of trance or other conditions simulating death, so that the true state of affairs is not detected, is, as you all know, grossly exaggerated. Never-

theless, this consideration may enter as a factor into an argument in favor of such skilled verification.

The main reason, however, for the verification of a death by expert testimony as to its cause is, that it is necessary to establish the fact that a death has taken place from what may be called natural causes as opposed to criminal causes.

This verification of death, and of the causes of death, may be made either by physicians employed for that particular purpose and paid by the State, or by the physician under whose charge the deceased person has been immediately before death, in which latter case only those cases which have not been under the treatment of a physician are referred to a public medical officer, or the coroner, for verification and determination of the cause of death.

The first system is that which is employed in France, Austria, and Belgium. The second is the one made use of in England and in this country.

All registration laws include the certificates of physicians as an essential part of their machinery. Some do this directly, requiring that physicians keep a list of all deaths occurring in their practice, and shall forward this list at stated times to the registrar. This method has invariably proved to be a failure, as has also the similar attempt to require of clergymen that they shall furnish lists of the marriages which they have solemnized. It is utterly impossible to enforce such laws under penalties, and not fifty per cent of either clergymen or physicians will carry out their requirements under ordinary circumstances.

Where burial permits are required, a physician may be made responsible for a certificate as to those matters only with regard to which his special professional knowledge is necessary, such as the cause of death, duration of sickness, etc. ; or he may be required also to certify as to the age, birthplace, parentage, occupation, etc. The great majority of physicians accept without hesitation the data furnished on these points by some member of the family, or whatever appears set down in the form of a certificate brought to them by the undertaker for signature. But there are always physicians who question the propriety of the law, and object to certifying to that of which they can have no personal knowledge, while some few may possibly decline.

The requirements of a registration law impose upon medical men who sign certificates as to causes of death a very considerable responsibility, much more considerable, in fact, than many of them probably realize. The physician is to consider whether his knowledge of the case is sufficient to enable him to determine whether or not the death was due to what are called natural causes, whether there is reason to suspect that violence, poisoning, criminal neglect, etc., may have been more or less factors in the result, and whether any certificate as to the nature of the cause is justifiable. The pressure upon the medical man to certify to more, or, sometimes less than he knows, is occasionally very strong, but the only course in doubtful cases is to indicate clearly what one knows, as distinguished from what he merely believes on the faith of statements made by others. In ordinary matters of daily routine occurrence, in which there is no apparent motive for falsification, we constantly do and must accept the statements of others, the physician acts as the primary judge of the evidence submitted by relations and friends as to the time of death, the age and race of the decedent, the duration of the disease, etc., and is justified in certifying to his belief in this evidence, very much as he is justified in certifying to the date of his own birth.

It has been objected * that registration laws may do very well for countries where people have been trained for generations in that line of action, but that they are at war with principles of democratic action and with individual freedom, and that the reason why physicians do not execute the law is because they not only have no personal interest in its execution, but because of a feeling of revolt against the injustice of a law which inflicts a special tax in the shape of time and trouble, and affords no compensation for the extra labor and expense.

These views are not those held by the majority of the medical profession, and it is not probable that the payment of a fee would add much, if anything, to the completeness or accuracy of the registration data furnished by medical men. Nevertheless, these objections have some weight from a legal standpoint, and should be borne in mind in attempts at legislation.

* Dr. H. M. Lyman, in the *Chicago Medical Journal*, 1878, p. 252.

Any attempt to compel a physician, under penalty, to report the age and birthplace of his patients, would, certainly, be worse than useless. The policy is not to call upon medical men to submit the information which should be demanded from the parent or householder. Under the police power of a State, certificates of the cause of death may be required from physicians as being necessary to secure life and protect property, but returns for merely statistical purposes, such as of births, cannot be required of any other than the parent.

There is no good reason why reports of births should be required from medical men. But as regards reports of deaths, it is to the interest of properly qualified members of the medical profession that such certificates should be demanded from them. Whenever and wherever certificates as to the cause of death from physicians are required, there must also be established some system of determining who are physicians within the intent of the law.

At first it may be necessary to accept certificates from any one and every one who chooses to call himself or herself a physician ; but the character of some of the documents of this kind which will come in will very soon indicate the necessity for some discrimination. Thus it is that the certification of the causes of death by physicans is the essential foundation, and it is the only essential foundation of legislation with regard to the qualifications which the State has a right to demand from practitioners of medicine.

The registration of marriages, births, and deaths is important to the individual, because it gives him increased security in his rights to property and to life, by enabling him to furnish proof of parentage and legitimacy, by increasing the chance of detection of fraudulent claimants to property of which he is the true heir, and by discouraging criminal attempts to shorten his life, owing to the fact that evidence must be furnished that death was due to natural causes, or a special legal investigation of the circumstances will be made. Of its importance to the community as a means of protection of health and life, and to scientific men and physicians as a means of investigation of some of their problems I need give no proof to this audience.

We can hardly be said to have a complete system of registration of births in any State or city in this country. Prob-

ably, the city of Providence, R. I., has the most complete records of this kind of any of our cities. As regards the registration of deaths, Massachusetts, New Jersey, the greater part of Connecticut and New York, a large part of Alabama and Minnesota, and most of our large cities, have now a fairly satisfactory system and complete record. For the rest of the United States, there is either no system of registration, or, if any exists, it is a very imperfect and incomplete one, the results of which cannot be depended upon, and which cannot be compared with the results obtained in the localities above referred to as having a complete system, and the only means which we have of estimating the mortality of these localities is by the reports of deaths for the preceding year collected by the census enumerators.

It is for this reason that the decennial United States Census is a matter of such great importance to scientific medicine and to practical sanitation—of much greater importance, in fact, than most physicians and health officials seem fully to appreciate. It is true that the death records thus obtained in the large areas of the country in which there is no registration are incomplete, and, as regards causes of death, especially inaccurate ; but they are the best we have ; they are becoming better at each census, and the death records in the registration areas serve to measure their reliability, and to indicate to some extent useful corrections.

As the value of statistics of deaths depends very largely upon the possibility of comparing them with corresponding statistics of the living population furnishing those deaths, it is evident that the modes and times of obtaining and of publishing the results of the census are matters of great importance to medical and sanitary statisticians. This is especially true as to the frequency with which a census is taken, the units of area made use of in its published tables, and the combinations of age, sex, race, and occupation data given in connection with such units of area.

Let us first consider briefly the time of taking the census.

The conclusions of the various statistical congresses with regard to the methods of the census are summed up by Korosi in his project for a census of the world, published in 1881.

The first of these conclusions was that the census should be

taken every ten years in the month of December, and in those years the number of which terminates with zero ; recommending, however, that intermediary censuses should be taken at the discretion of different governments.

The taking of the census at the end of December has the advantage that a relatively greater number of population are in their own homes than at any other time, and that it corresponds to the termination of the calendar year, at which date many State and municipal reports terminate, so that all the figures, being for one date, are readily comparable with each other. For a very large part of this country it would be quite as easy to take the census at the end of December as on the first of June ; but there are some sections in which attempts to take the census in the midst of cold and rainy weather, for a thinly scattered population, would be made under very great difficulties.

In a paper read at the British Health Congress in May, 1889, Sir Edwin Chadwick urges the desirability of an annual census for the improvement of public administration, referring to the fact that "in commerce and in manufactures, as in every large company, there is an annual stock-taking, and upon that stock-taking a report and declaration of the results are made to the stockholders. But what is the state of the political administration which has only attained to a stock-taking of the living people, of the healthy and the weakly, on whom the power and prosperity of the country depend, which is only attempted every ten years, and is only completed in three years, leaving the numbers, meanwhile, to be got at by estimates, necessarily erroneous—often widely erroneous. An annual census of the more numerous animal stock has been lately striven for and attained, and is worked out by the Agricultural Department of the Board of Trade. It is some forty-five millions of the agricultural stock, while the population of England and Wales is about twenty-eight millions. Other nations, as France and the United States, have halved the inconvenience of the stock-taking of the human population."

Sir Edwin is in error in this last statement, for the United States Census is taken but once in ten years, and but a few States have thus far taken the intermediate census, which would make the enumeration come at quinquennial periods.

In the law providing for the last census an attempt was made to induce the States to take this intermediate census, by an offer that the United States should pay one half of the amount paid to all supervisors and actual enumerators in the State, increased by one half of the percentage of gain in population in the State, provided that the schedules used should be similar to those used in the census of the United States, and that a full copy of all schedules returned, and reports made, shall be deposited with the Secretary of the Interior on or before the first of September following.

This proviso, however, has not had the effect designed, probably for the reasons set forth in the report on the census of Michigan for 1884—namely, that at least two months are required to make the enumeration, transmit the blanks to the Secretary of State, and arrange them, which leaves but one month (August) for correction of errors and for making the full copy of the schedules. As applied to the State of Michigan, this would require a thousand or twelve hundred clerks for twenty-five days. The amounts paid the supervisors and enumerators for the United States Census of 1880 were $71,192.06, the one half of which, increased by one half percentage of gain, gives $42,401.99 as the amount Michigan would have received from the general government if its census had been taken in conformity with the national census law. But it would have cost from $60,000 to $70,000 to copy the schedules and reports, or from $18,000 to $20,000 more than the amount that would have been received from the national treasury to compensate for the work. A few sets of territorial schedules were sent in, but nothing was done with them.

Sir Edwin, however, urges that even the quinquennial census would be considered insufficient for business purposes in the ordinary affairs of civil life, and refers to the fact that the proposition for an annual census in the European governments was discussed at the International Statistical Congress at the Hague, having been proposed by himself and strongly seconded by Professor Engel, the head of the Statistical Bureau of Prussia. The matter was appointed to be the subject of discussion at a future Congress ; but, in the mean time, the meetings of the Congress were interrupted, and the matter has never again come up as a subject for international discussion.

Annual censuses have been tried and abandoned in Canada. Triennial censuses have also been tried, but the general conclusion seems to be in favor of five year periods.

In Austria, Belgium, the greater part of the British Empire, Denmark, Holland, Hungary, Italy, Norway, Sweden, Switzerland, and the United States, the census is decennial.

In the Sandwich Islands a census has been taken every six years since 1853.

In France a census was taken in 1801, 1806, and every five years since 1821.

In Sweden, every five years from 1775 to 1860.

In Germany, every five years since 1866.

In Finland, every five years since 1875.

In Sweden, every three years from 1749 to 1775.

In Baden, every three years from 1818 to 1867.

In Hanover, every three years from 1830 to 1864.

In Prussia, every three years from 1834 to 1867.

In Saxony, every three years from 1834 to 1867.

In Bavaria, every three years from 1834 to 1867.

While in Upper Canada (now the Province of Ontario) a census was taken annually for nineteen years, from 1824 to 1842.

In New Zealand nine censuses have been taken since that of 1861, at intervals of from three to seven years, the last interval being five years.

In Queensland there is also a quinquennial census.

While it is not probable that any agreement for an annual census for the whole country will be made in the near future, either by the United States or by State Governments, it is certainly quite possible that the desirability for more frequent enumerations in the larger towns and cities will soon become so evident as to lead to systematic arrangements for carrying it out. Even now, many cities take what they call a police census, at irregular intervals of from three to five years, for the purpose, mainly, of making rough subdivisions of the voting populations in the form of precincts, and of obtaining information for the purpose of levying taxes, more especially for school purposes. These police censuses, however, relate only to adult males, and upon them are based estimates of the number of the remaining population, which are used by the sanitary

officials in computing death-rates. These estimates, however, are almost invariably too high, as is shown by the next State or national census, and, in any case, afford no satisfactory basis for computation as to the number of inhabitants in the different wards of the city, owing to the great variations in the ratio between the voting population and the rest of the people in different classes of society and in different parts of a town.

By the use of proper schedules, somewhat on the English system, left at each house, there should be very little extra expense over that of the ordinary police census in collecting sufficient data with relation to the entire population of a city, to give accurate data with regard to the vital statistics of the population, and these, combined with a good system of registration of deaths and of marriages, would give the means for a system of vital statistics of a place such as, at present, no city in England or in this country possesses.

The unit of area made use of in furnishing the census data is a very important matter in connection with the statistics of deaths, for, practically, these last must be classified by the same areas. The census units of area have usually been fixed by political considerations with reference to votes, to taxation of various kinds, and to military service. In this country, the smaller unit is usually the county or city, or, in some cases, the wards of a city, the larger units being the State or Territory.

For the purposes of vital and medical statistics, such units of area are often of little or no importance, because the boundaries of wards, of cities, of counties, and of States are not fixed with reference to the peculiarities of topography, drainage, character of habitations, or of the people, which are important factors in the causation of disease and death, and which, therefore, require study, with the object of properly dividing the population for purposes of representative government. Moreover, in the publications of the several censuses prior to that of 1880, the population of the smaller areas, such as cities and counties, was, as a rule, given with distinction of sex and of color only, while the most important factor in vital and medical statistics—namely, age, was stated in detail for States only. In the census of 1880 an important advance was made in this respect, for in connection with the mortality

statistics the population of each county having 10,000 inhabitants and upward, and of the large cities, was given with distinction of age under one year and under five years for each sex of each color.

In the next census the population by counties will be given with still further distinctions of age ; it will be given with distinction of age under one year and under five years for wards, and in about a dozen of the largest cities it is proposed to select certain areas which present peculiarities as to topographical features, or as to the character of the people inhabiting them, and to give the population of these by age, sex, and color, as a basis for the study of the death-rates of these localities. In a large city like New York, even the ward is usually too large to be a satisfactory unit of area for statistical study, since one ward will contain some of the best and some of the worst habitations, and include classes of people having very different means, habits, and death-rates.

In the annual report of the city of Brussels the population, births, and deaths are given by streets, courts, and alleys. This does very well for Brussels, where the streets are short ; but in our large cities, regularly laid out in rectangles, where the streets are miles in length, and traverse localities differing widely in topography and in character of population, it does not seem to be applicable.

The data required on individual certificates of death should correspond to those required on the schedules of living population, and, in addition, should give the cause of death.

The death-rate, or mortality, is the ratio between quantity of life and loss of life. It refers to a definite unit of time —viz., one year's life of one person, and the quantity of life is the sum of the time lived by each of the population expressed in years. Two persons living six months each, or twelve persons living one month each, have one year of life. If the population is assumed to be stationary—that is, one in which the births and deaths and the emigration and immigration are exactly equal to each other, and similarly distributed throughout the year, then the number of the population multiplied into the time under consideration, expressed in years and fractions of years, gives the quantity of life.

A population usually, however, increases in geometrical

progression, and in such case we must find, by means of a well-known formula, the mean population of the period, which will be less than the arithmetical mean of the populations at the beginning and end of the period, and greater than the population living in the middle of the period ; but the differences are small, and, in most cases, either figure may be employed.

For example, suppose we wish to calculate the death-rate of New York City for the year 1888. By the censuses of 1870 and 1880, we know the population on June 1st in each of those years. From these we determine the ratio of increase, and thence the population on January 1st and December 31st, 1888, from which the mean population can be computed, or the arithmetical mean be taken. Or we can compute directly the population on July 1st, 1888, and it makes little difference as to probable accuracy which of these three estimates of population we take.

You will perceive that this method rests on the assumption that the ratio of increase of a locality during ten years as determined by the census, continues unchanged and uniform thereafter. This is hardly ever true, and, for many localities in the United States, and especially in the rapidly growing West, it is very far from the truth, which is a strong argument for more frequent counts.

Various methods are used by statisticians to correct the estimates of population made for a city at periods other than during a census year, as determined by a formula of arithmetical or geometrical proportion, among which may be mentioned the use of the ratios supposed to exist between the number of houses or the number of voters, or the number of school children and the total population. The number of houses is determined from tax records or by a special count ; the number of voters by registration lists or by a police census ; the number of school children by a special census ; and the ratio which these bear to the whole population is guessed at, or is calculated from the data obtained at the last census.

The most useful and reliable of these methods is the use of the average numbers of presumed occupants of inhabited houses, the other ratios being of very little value.

This has been very well shown by Dr. Russell, Medical Offi-

cer of Health at Glasgow.* In the case of Glasgow, he considers the estimate of the population based on the number of inhabited houses and the estimate based on preceding censuses, and finds that both methods give a population above the actually existing one as shown by the next census. The error in the estimates based on the previous census was due to a change in rate of growth. The error in that based on the number of houses was due partly to incorrect data of the number of inhabited houses, and partly to an error in calculation.

In the United States Census of 1870 the number of persons in a dwelling in the large cities varied from 14.07 in New York to 5.20 in Toledo, these differences being due, to a considerable extent, to the counting of large tenement-houses containing numerous families as a single dwelling.

If we take the data by families, we find in the same census that the largest number of persons to a family was in Kansas City, the number being 5.78, while in New York it was but 5.07.

In 1880 the proportion of persons to a dwelling ranged from 16.37 in New York to 4.68 in Memphis. In Baltimore it was 6.54; in Boston, 8.26; in Philadelphia, 5.79. The number of persons to a family was: In Baltimore, 5.8; in Memphis, 4.23; in New York, 4.96; in Philadelphia, 5.13.

It is evident that no value can be placed on estimates of population of a city based upon the number of habitations it contains, if a cottage and a tenement-house are to be equally reckoned as a habitation.

Estimates of the population based on police censuses, on the number of school children, or on city directories, are of very little use, being, in almost every case, in excess of the truth. No general rules can be laid down for the estimation of the population of a city at a period between two censuses. It is a special problem in each case, for the solution of which there are needed an acquaintance with the locality, to be sure that boundaries have not changed, the information which can be obtained from special local censuses, from the number of inhabited buildings, from migration statistics, etc., all of which must be applied to the data furnished by the last gen-

* The Decennial Census as a Basis for Statistics in Intervening Years. Glasgow, 1881.

eral enumeration of the people, which, in any case, must be resorted to for the ratios which are to be used.

It is to be observed that municipal statisticians and registrars rarely make use of the means afforded by a general census to correct the figures of population ; and, therefore, rarely after death-rates which they have given for the years intervening since the last census ; yet it is highly desirable that this should be done in order to prevent the use of misleading figures. For example, in Chicago, in 1873, the registrar estimated the population of the city at 400,000, and deducted therefrom the death-rate for the year as 23.89. Comparing the populations in 1870 and in 1880, it is apparent that the true population was about 350,000, giving a death-rate of over 27.

In Boston, in 1876, the estimated population at the time was 352,758, giving a death-rate of 23.39, while the true population, as shown by comparison of census data, was about 313,000, giving a death-rate of over 26.

The shorter the period for which a death-rate is given the greater is the liability to error. The ordinary forms of weekly death-rates reported for large cities are annual death-rates—that is, they represent what would be the annual death-rate if the proportion of deaths to the population for the week continued for one year. If, for example, a town having a population of 100,000 reports as its weekly death-rate for a given week 25 per 1000, this does not mean that during the week there occurred 2500 deaths, but it means that if the population and number of deaths each week continued the same during the year, 2500 deaths would have occurred in the course of the year, or that for the week in question the number of deaths was 2000 divided by 52.17747. A weekly death-rate is useful to show where the greatest variations have been in the year's mortality, but it is no indication of the health of a town for a particular week, and it is useless as a means of comparison of the healthfulness of one town with that of another. This is largely due to the law of probable deviation or error in mortality statistics in relation to the number of instances used as data without reference to their accuracy. This law of probable error in relation to number of data is an exceedingly important one to be kept in view in all statistical inquiries, and especially in those relating to vital and medical statistics.

For example, suppose that in a village of 1000 inhabitants there occur 25 deaths in the course of a year, and in a neighboring city of 10,000 inhabitants there were 200 deaths in the same time. What is the probability that the death-rate of 25 per 1000 for the first and 20 per 1000 for the second, indicate the relative healthfulness of the two places, supposing the data to be perfectly accurate, and that we have no other information in regard to them than that stated?

Or suppose that during one year, in a population of 100,000 persons there occur 2000 deaths, what is the probability that in a second group of 100,000 persons under the same circumstances, the number of deaths in a year will not be less than 1950 nor more than 2050?

The answers to such questions as these are furnished by formulæ derived from the mathematical laws of probability. The simplest of all these formulæ, and the one most practically useful for rough and ready calculations in cases such as that given in the first example, is, that the mean or probable error is equal to the square root of the number dead. By this rule the probable error for the village of 1000 inhabitants for 25 deaths would be 5, and, therefore, the mortality in this place might vary between 20 and 30 per 1000, without any certain indications of variation in the sanitary conditions of the place. In the city of 10,000 inhabitants with 200 deaths, the probable error is a little less than 15, the variation between 185 and 215 corresponding to an average mortality of 18.5 to 21.5 per 1000, being a probable variation of only 3 per 1000 instead of 10, as in the first case. It is very clear, then, that in comparing these two mortality rates, no positive conclusion can be drawn as to the relative healthfulness of the two cities, seeing that the probable variations overlap, as it were, for the rates ranging from 20 to 21.5.

The formula that the probable variation in the number of deaths is the square root of that number gives results that are somewhat too great, being merely an approximation to the true formula, which is of much more general application, but requiring too much computation for general use. I shall refer to this matter of the law of error in more detail in speaking of medical statistics. For the present, I only call your attention to the fact that it is necessary to bear in mind the absolute

numbers as well as the percentages, and that, therefore, statements of ratios only are insufficient for definite conclusions.

What is a fair or normal death-rate? Taking an average healthy rural district in the United States where there is little migration the annual gross death-rate for the whole population will be from 13 to 15 per 1000. In towns of from 10,000 to 15,000 inhabitants, having a good general water supply and proper sewerage, the gross death-rate should not exceed 16 per 1000. In cities of from 20,000 to 100,000 inhabitants it should not exceed 17 per 1000, while in cities of over 100,000 inhabitants it should not exceed 19 per 1000. The great causes of high death-rates are poverty, overcrowding, intemperance, excess in heat and cold with moisture, foul air, bad food, impure water, uncleanness, contagion, ignorance, etc.

The statistics of births are of much importance in vital statistics because of the influence of the birth-rate upon the sex and age distribution of the population. Unfortunately, in this country, as I have already explained, hardly any locality possesses such an enforced system of registration of births as to permit of an annual calculation of birth-rates and their comparison with the deaths of children under one year of age, or those born within the year. We can only obtain this data for any large extent of country by referring to the census records.

The usual method of indicating the birth-rate is by giving it as the proportion per 1000 of births to the population of all ages; but a much better and more satisfactory mode of computation is to calculate the number of births to the number of women between the ages of 15 and 50 or 55, living in the community referred to.

The general subject of birth-rates is interesting chiefly, in relation to social statistics, to the fecundity or rate of increase of population or of people of different races; but in relation to mortality statistics it may also become an important factor in the calculations.

There has been from time to time some controversy between statisticians and health officers with regard to the influence of birth-rates upon death-rates, or as to the precise relations which exist between the two. As the death-rates of infants are much greater than those of the population at higher

ages, it has been claimed by some that where there is a high birth-rate there is also a high death-rate ; but it cannot be said that this will invariably be the case, or that the one is directly the cause of the other, except in certain cases for a comparatively short series of years.

Starting with a population, if possible, numbering in all 308,378, supposing that there are no migrations, and taking the death-rates for each group of ages to be shown by the New York life table, we have calculated the progress of such a population for one hundred successive years under two suppositions, the first for a constant birth-rate of 35 per 1000, and the second for a constant birth-rate of 45 per 1000. The death-rate at the commencement was 32.42 per 1000. Under the influence of a constant birth-rate of 35 per 1000 this death-rate increases during the first period of five years to 33.17, and after that steadily sinks until, at the end of fifty-five years, it becomes less than the original death-rate, and at the period of sixty-five years has sunk below it, after which it again rises until, at the end of one hundred years, it has reached the rate of 32.44.

Taking now the same population under the same circumstances at a constant birth-rate of 45 per 1000, we see that the death-rate rises in the first five years to 36, after which it steadily sinks as it did in the former case, until, after the lapse of sixty years, it is only 32.01, after which it again rises, and, finally, comes down to a point a little below that from which it started. In both these cases, then, it is evident that the high birth-rate for a time produces an increased death-rate, since there are no other circumstances present to account for the change. But after the first five years the proportion of those living at the ages at which there is the lowest mortality has been so much raised as more than to counterbalance the large number living in the first years of life, and, therefore, the death-rate steadily descends.

But to understand the full effect of this change it is also necessary to consider the average age at death. Here it will be found that the average age at death at the commencement being 31.37, decreases to 29.65 under the influence of a constant birth-rate of 35 per 1000, while, with the higher birth-rate of 45 per 1000, it diminishes as the death-rate diminishes

to the age of sixty-five, at which period it is only 23.02, after which it again rises as the death-rate increases.

Comparing with this the proportions of the population living at each group of ages at the beginning and end of the one hundred years under each of these two different birth-rates, it is found that under the influence of the higher birth-rate the proportion of the population under twenty-five remains high, while after that age it falls below the original figures.

As a rule, high birth-rates occur in cities and in the crowded parts of cities, among the laboring classes of the population, where the causes of disease and death in infants are especially prevalent.

On the other hand, it is to be noted that a high death-rate among infants has some tendency to increase the birth-rate, because the interval between childbearing is shortened by the early death of the infant ; and in the effort made by poor women to avoid frequent childbearing, a common means is to suckle the infant up to at least two years of age, in order to prolong the interval between pregnancies, which is a practice injurious both to the mother and to the child.

If we had under consideration a community in which there were no migrations, and in which the population neither increased nor diminshed, the relations between birth rate and death-rate and the average duration of life could be expressed by a simple formula in such a way that, given either two of these quantities, we could determine the third. If, for example, in a population of 1000 persons five births and five deaths occur annually, and if we assume that every individual lives to the same mean age, evidently just two hundred years would elapse before the whole of the original 1000 would have died. This two hundred years would be the mean duration of life ; and this would be the case also if deaths occurred at different ages ; only in such a case many would die below the mean age, when some would greatly exceed it. This subject has been considered by Dr. J. S. Bristowe,* who says that " there can be no difference in the healthiness of two localities, in one of which the death-rate is twice as high as that of the other, provided other conditions are such that in both cases

* " On the Mutual Relations of the Birth-rate and Death-rate." St. Thomas's Hospital Reports, New Series, vol. vii., p. 245, London, 1876.

the inhabitants attain the same mean age ; or, conversely, supposing different populations to enjoy the same mean duration of life, any differences which may be presented by their respective death-rates are due to other circumstances than differences of health." He also says that the average duration of life can be determined by the birth-rate and death-rate taken together, but not from the death-rate alone. If he means by healthiness, mean duration of life, this statement is equivalent to saying that where the mean duration of life is the same it will be alike, an indisputable proposition, though not a very instructive one. But if by healthiness is meant the sum of the conditions of the locality as to altitude, drainage, cleanliness, etc., which tend to lessen or increase deaths in the people living in it, then the statement is incorrect, for it does not take into account age, sex, or race distribution, occupations, or migrations. Setting the question of migrations entirely aside, it is perfectly possible that two populations attaining the same mean age, and having the same death-rate, may live in two localities, one of which is decidedly healthier than the other, so that if the two communities exchanged habitations, a marked difference in the death-rates and mean age at death would result.

Putting aside all these purely speculative considerations with regard to what might happen in a stationary population, where there is no migration, let us see what the significance of death-rates is in our cities and rural districts as they now exist. We wish to know how much of the death-rate is due to peculiarities in the character and occupation of the population itself, and how much to peculiarities in the locality, and for each of these classes we wish to know how much is necessary and unavoidable, and how much is due to causes which may be modified or done away with. Precise knowledge on these points we can never have, but we can obtain a sufficient degree of probability to guide our action in the premises.

If we wish to study carefully the influence exerted upon health and life by race characteristics, by residence in a given locality, by marriage, occupation, social standing, etc., we must have the means of comparing results given in different localities, or in the same locality at different times, or for different races, occupations, etc., under like circumstances.

To accomplish this we must, as far as possible, estimate the influence of other circumstances not connected with the particular point which we are investigating, but which, notwithstanding, exercise a powerful influence upon sickness and death-rates, and of these, the two most important influences are those which differences in proportion of sexes and ages of the population to be compared exert.

The means recognized as best calculated to eliminate the influence of sex and age by, as it were, reducing the population to one uniform scale in these respects, is by calculating the expectation of life at each age for all the several conditions of locality, occupation, etc., which we wish to investigate; in other words, by the preparation of what are known as life tables. A life table shows what would be the tendency or liability to death at each age in a population in which there is no migration, and in which the births and deaths just equal each other, if such a population were subjected to the same influences tending to produce disease and death as have affected the actual population under consideration, and from which the data are derived. It is, of course, impossible to prepare life tables which shall be strictly accurate and exactly comparable one with another, because it is impossible to obtain strictly accurate data. A life table is intended to answer the question, "Of a million children born, how many of each sex die at each age?" or "What is the time which a man or woman of a given age may be expected to live?" A strictly accurate answer to this question could be given only if we knew the precise dates of birth and death of each of a million of children born under the circumstances we are investigating; and, strictly speaking, this million of children should all be born on the same day. Notwithstanding, by using large masses of data which are more or less attainable, and by applying certain well-known corrections, the individual errors tend to neutralize each other, and we can prepare tables which will be quite accurate enough for purposes of comparison.

Probably the earliest form of such a table known is that given in the Pandects of Justinian by Domitius Ulpianus, commonly known as Ulpian, a distinguished lawyer, who was the secretary of Alexander Severus, and who wrote in the beginning of the third century of the Christian era. This table

is found in an extract from his writings given in the Pandects in a treatise by Æmilius Macer. Ulpian states that in Rome registers of Roman citizens, including the data of age, sex, and death, were kept by the city from the time of Servius Tullius to that of Justinian, including a period of one thousand years. From these data, which applied to the more prosperous class, Ulpian gives a scale for estimating the purchase value of communities according to the different value of life at different ages, and sums it up in saying that it is usual to compute thirty years' maintenance for all those under thirty years of age, and that for all over that age as many years are allowed as they lack of sixty.

In connection with the question of annuities, Ulpian gives a scale for estimating them, which is apparently the probable length of life of persons of the ages named.

The first life table of modern times was constructed in 1692 by Dr. Halley from the registers of the city of Breslau for five years, and was printed in the *Philosophical Transactions* in 1693. The data for this and for other similar tables constructed in the eighteenth century were too imperfect to permit of good results, and the first life table which was selected as of sufficient accuracy for business purposes is what is known as the Carlisle life table, compiled by Mr. Milne in the early part of the present century.

We now have a considerable number of life tables applicable to the special classes of those who are likely to insure their lives, derived from the experience of a large number of insurance companies in Europe and in this country; and also a number of life-tables derived from the data of the whole miscellaneous population of the country for England, France, Germany, Sweden, and for certain parts of this country.

In order to prepare a life table for a given locality or occupation we must know the number of persons living at each year of age, and the number of deaths at each age which have occurred among these persons for one or more years. We assume that deaths have occurred at regular intervals during the year for each age, and proceed to compute the number of persons at each age who were living in the middle of the period for which the deaths are registered.

In using census data, however, we cannot directly compare

the deaths at each single year of age with the number reported by the census as living at that age, because of the strong tendency of the average man or woman to report ages either of the living or the dead, but especially the former, in numbers which are multiples of ten or five, or in so-called round numbers.

An examination of the census of Massachusetts and New Jersey for 1880 will show that the death-rates calculated from it would indicate that the mortality at 25, 30, and 40 is much less than that at the ages immediately preceding and following them. Thus, it would appear that in Massachusetts the mortality of white males at the age of 50 is only 9.42 per 1000, while at the age of 49 it is 16.11, and at the age of 51 it is 19.16 per 1000. There is, however, no such abrupt change in the law of mortality at the age of 50 as these figures would indicate, and it is necessary, therefore, to make corrections for this source of error. It is true that the error in the number of deaths reported at the even decades is usually in the same direction as the error in the number of the living population, and therefore tends to neutralize the error in the computation of ratios ; but this is not always the case, and the error is almost invariably in the direction of making the mortality at the even decades too low, and for the adjacent years too high.

The error in question may be corrected in distributing the excess reported at the even decades to the adjacent years, by aid of the calculus ; but the easier and usual way is to calculate the mortality rates by groups of ages, including five or ten years in each group—that is, for the periods 20–24, 25–30, 30–34, etc., or for the periods 20–29, 30–39, etc., or for the periods 25–34, 35–44, etc. Of the three modes of grouping, the last is the best, because it properly distributes the excess about the even decades, which is the greatest.

If we take the group of ages 20–29, 30–39, etc., the whole excess for the year 30 is distributed in the succeeding years, whereas a part of it really belongs to the years in the preceding group. This objection applies to a much less degree to the grouping of 35–44, 45–54, etc., for the excess at 45 is much less than at either 30 or 40 ; still it is well to remember that approximate life tables, calculated as I shall indicate, give for this reason somewhat less than the true mortality, and somewhat too high an expectation of life for adult ages.

This source of error affects all mortality statistics derived from the results of a national census and from the ordinary system of registration, but it does not affect mortality statistics derived from the records of life insurance companies, in which it may be presumed that the ages of both the living and decedents are accurately stated.

I do not propose to describe the methods of constructing a life table. To make one sufficiently accurate to be used for the purposes of life insurance requires elaborate calculations and corrections, and the use of complicated mathematical formulæ; but the construction of an approximate life table in which no attempt is made to secure regular gradation is a comparatively easy matter, and has been fully described by Mr. N. H. Humphreys in a paper in the *Journal of the Statistical Society* for 1883, which method was made use of in calculating the approximate tables given in the mortality statistics of the last census.

RUSTLESS IRON.—The rustless process, which has been until lately an experiment, has now demonstrated that great economy can be used, not only in ice pipes, but in every article where iron is used. In the past year over 2,000,000 kettles have been subjected to this process in Pittsburgh. The method is very peculiar. After the article is made it is put into a furnace about 3½ feet high, 15 feet long, and 8 feet broad. The furnace is made in an oval shape, air tight. After the iron has been in the furnace for two hours and has attained almost a white heat, the air that comes through the regenerators and air valves is shut securely off, and the furnace is made air tight.

After the air has been shut off the superheater, which is located in the combustion chamber at the rear of the furnace, and at right angles from the air valves, is opened, and the furnace is filled with steam and kept in this condition for eight hours. At short intervals a small valve is opened, so as to allow an exodus of steam in the furnace, allowing fresh steam to be put into the furnace.

When the articles have been ten hours in the furnace there has been accomplished the formation of magnetic oxide upon the iron surface. They are then put into an acid well, which is the last treatment.—*Sanitary Plumber.*

STAMINA.

READ IN THE SECTION OF STATE MEDICINE, AT THE FORTIETH ANNUAL MEETING OF THE AMERICAN MEDICAL ASSOCIATION, JUNE, 1889.

By A. N. Bell, A.M., M.D.

THE object of this essay is to reduce the signification of the words "susceptibility," "predisposition," and "heredity."

In the progress of baceteriological knowledge, there is too little attention paid to the organic conditions of health, and the resisting power of the system in conflict with antagonistic forces. Thirty years ago, while engaged in the study of "Living Things," the writer had occasion to observe: "Man's life is inseparably linked with the plants and animals which coexist with him, and these are the issue of long anticipations and preparations, where all the changes produced in other objects occur according to a relation existing among the substances changed. Latitude, elevation, nature of the soil, degree of cultivation, relative position in regard to mountains, forests, rivers, etc., and general aspect of the neighborhood, all modify the condition of man, and prove his adaptability by such effects as serve to make him understand his relations to what is around him. We cannot prevent the dews of heaven, nor the heat of the sun, nor the progress of decomposition; but we can understand the course and order of natural phenomena, we can trace out the laws that govern them and ascertain our relations to them." *

The reward of man's cosmopolitan nature and free agency is the progress of human welfare, even though won at the cost of impaired health and premature death by those who do the most to promote it. But the influence is reciprocal. Man reacts upon nature no less than nature upon him. Indeed, the changes effected in natural phenomena by human agency

* "Knowledge of Living Things, with the Laws of their Existence," by A. N. Bell, A.M., M.D. Bailliere Brothers, New York, 1860.

are the striking characteristics of conditions promotive of or in conflict with human health everywhere. This reciprocal action should, above all things else, make the progressive man alive to the importance of constructing and sustaining his ability to contend against the antagonistic forces—both natural and artificial—with which his sphere of life is everywhere intimately associated. And in the application of this knowledge he will learn that health is something more than mere freedom from disease. Health is *opposed* to disease and its causes by the relative integrity, strength, and vigor of all the organs and functions of the body, fortified by such conditions as the human organism depends upon for its fabrication and resistance. For example: Two individuals, the one endeavoring to live by rule, and having much to say about the "laws of health," afraid to run upstairs because it makes the heart beat more rapidly, hurries the respiration and fills the lungs; can't eat cheese because it constipates the bowels, nor cherries for the contrary reason; never drinks water, or but very little, with meals; can't take a glass of milk at bedtime, or a hot roll for breakfast, because such food always sets heavy on the stomach; never eats bacon or pork, and eschews fat meat of all kinds; takes an hour at meals and always leaves off hungry; would not take a cold bath for anything; who prefers the weight of a thick fur-lined overcoat or cloak to a light one and a brisk walk on a cold day; and sundry other postulates promotive of tenderness. And the other—the reverse: Who is neither afraid to hurry at his meals or to his business; not only runs upstairs, but a long hill, or, if in a hurry, forty rods or more after a railroad car; who has taught his stomach, as he has his arms, legs, heart, and lungs such lessons in gymnastics as not to be too dainty, and to profit by the variation; who satisfies hunger and thirst; when among Romans, live as they do; finds hog, hominy, and hot bread digestible, wholesome, and nutritious; has, in short, never tried to live by any rule, except temperance in all things and protection against the extremes of weather. Both of such persons may be equally free from disease, but is it necessary to add that the power of the latter to resist it in every respect—whether it be inhaled, swallowed, inherited, or by exposure to inclement weather—is greatly in favor of the well-nourished and the

strong? And the relative immunity depends not upon predisposition, but upon stamina.

With regard to certain infectious diseases to which children are especially liable, in part, doubtless, because of their greater functional activity, but chiefly because their power of resistance has not yet become sufficiently fortified—for it is well known that adults generally who have not encountered those diseases in childhood rarely contract them subsequently—the same relative immunity exists; the strong and vigorous child is much less likely to contract them than the feeble; and the convalescent, those who are particularly feeble from any one of such diseases, are well known to be the most of all liable to attack and to succumb from another. And of pulmonary consumption, the most prevalent and the most fatal of all diseases, who does not know that enfeeblement invites it? That individuals are less and less liable to it—whether traceable to hereditary taint or otherwise—in proportion as codling has been avoided, appetite for wholesome fat food cultivated, cold bathing habitual, protective but loose clothing worn, and exercise in the open air unrestrained? By the maintenance of these conditions all the processes of healthy organization are promoted and the constitution fortified against tubercle bacilli, as, in like manner, against other disease germs, no matter whence the quarter or at whatever age of the individual exposed; and no less against diseases not attributable to germs. And the more if we accept Metschnikoff's theory of the office of the *leucocytes* or white blood corpuscles, for these in both number and strength depend upon proper nourishment. "In health," says Kirke, "the proportion of white to red corpuscles, which, taking an average, is about 1 to 500 or 600, varies considerably, even in the course of the same day. The variations appear to depend chiefly on the amount and probably also on the kind of food taken, the number of leucocytes being very considerably increased by a meal, and diminished again on fasting. Also in young persons, during pregnancy, and after great loss of blood, there is a larger proportion of colorless blood corpuscles, which probably shows that they are more rapidly formed under these circumstances. In old age, on the other hand, their proportion is diminished." *

* Kirke's "Hand-Book of Physiology," Vol. I., p. 79.

No good observer will fail to recognize the coincidence of the condition which diminishes the proportion of leucocytes and the increased liability to disease—that of fasting ; or note the no less remarkable coincidence, the diminution in the number of the leucocytes and increasing infirmity of old age. The leucocyte or colorless blood corpuscle is an *amœba*, the simplest type of a living thing ; a jelly-like mass of protoplasm, of the same consistence throughout, which possesses the property of moving about and capturing its prey by changing its form by the protrusion of first one part of its body and then another, and of extemporizing a stomach by wrapping itself around any nutritive particle with which it comes in contact and digesting it. On account of this peculiar property and apparent function of the leucocytes Metschnikoff has conferred upon them the name of *phagocytes*—eaters—as expressive of their most distinctive feature, and of the process in general, *phagocytosis*.

" It has long been known," says Dr. William Osler,* " that foreign bodies such as ligatures, portions of dead bone and other substances, may be completely removed by leucocytes.

" Nowhere in the body do we have such a facility for studying the action of phagocytes as in the organs of respiration, in which, with the cilia of the bronchial mucosa, they share in the work of cleansing the air-passages ; and of these two important agencies it is hard to say which plays the more important part in the expulsion of those particles of foreign matter which, in cities at least, we constantly inhale. There are several groups of cells engaged in this work : The ordinary mucus corpuscles ; the alveolar epithelium ; the connective tissue-elements of the pulmonary stroma, and the leucocytes of the lymph tissue in the bronchial, tracheal, mediastinal glands.

" The examination of the morning sputa of a cigarette-smoker, or of a person who has been exposed to a dusty atmosphere, shows very clearly that no small proportion of the carbon grains is included within protoplasm. The free granules are abundant, but almost every leucocyte has its little load which it has picked up on its road from the finer tubes to the trachea.

* Address before the Alumni Association of Bellevue Hospital, New York, April 3d, 1889.

"It is possible to conceive, under certain conditions, of the air cells gradually filling, were it not for the activity of phagocytes, derived largely from the alveolar epithelium, which stands, as it were, at the gateway of the lymphatic circulation.

"In dwellers in the country, as well as in wild animals, breathing an air comparatively pure, the cilia and the phagocytes in the air-passages appear quite able to prevent access of the carbon grains to the lung tissue; whereas in the dwellers in the cities, and in animals kept in confinement, the impurities in the air are so abundant that these agents are insufficient, and sooner or later the grains penetrate the air cells.

"The steps in this process described may be followed in the lungs of any town dweller, but to see in perfection the remarkable activity of the pulmonary phagocytes, one must study the early stages of anthracosis, particularly in those exceptional cases which we see occasionally when a miner has been killed by accident or dies of acute disease. It is not, I think, too much to say that the larger part of the pigment contained in lungs, almost, if not quite black, is enclosed in protoplasmic cells.

"A physiological process in which phagocytes play a leading rôle is the removal and disintegration of the red blood corpuscles which have lived their life and are no longer fit for work. The cells containing the red blood-corpuscles which are found in the bone marrow and in the spleen, however much opinion may differ as to their mode of origin, cannot, I think, be regarded in any other light than as phagocytic elements with this definite function.

"In the mature body we have seen that in the lungs, in the intestines, and in the blood-making organs, the phagocytes have most essential functions; but the question of chief interest to-day relates, not so much to this normal process about which there has never been much doubt, as to the supposed part which these cells take in protecting the body against the invasion of parasites.

"Metschnikoff has studied a number of diseases—erysipelas, anthrax, relapsing fever, and tuberculosis—with a view of finding facts in support of this theory, and his communications within the past four years have been numerous and elaborate.*

* Published chiefly in Virchow's Archiv.

"In erysipelas the cocci are attacked first by the leucocytes filling the lymph spaces, which rapidly proliferate and actively eat the micro-organisms. Not alone do the colorless corpuscles act as phagocytes, but the fixed connective tissue cells assist in an important manner. In cases of recovery he found that behind the advancing cocci the leucocytes were crowded with parasites, which showed evidences of digestion and destruction. The connective tissue cells do not appear to attack the cocci, but are chiefly concerned with the absorption of the inflammatory exudate, even taking up the leucocytes which have died. In fatal cases there was enormous development of micrococci, the majority of which lay free in the tissues not enclosed in the phagocytes.

"As we might suppose, the views of Metschnikoff have met with sharp criticism in many quarters, and from no one more ably and at greater length than from Baumgarten.* While not denying that the leucocytes eat the bacteria, he claims that the process is by no means universal, and is carried on so unequally, that we can scarcely speak of an active warfare waged against the parasites.

"Metschnikoff states that in malaria the parasites are attacked chiefly in the spleen and the liver by the larger phagocytes existing in these organs, and to a much less extent by the leucocytes in the circulating blood.

"We see, then, in malaria very little evidence in the blood favoring a theory of phagocytosis; certainly no such campaigning on the part of the leucocytes as might be expected from the presence, in such numbers, of foes so destructive to the red corpuscles."

Dr. Osler concludes that "while phagocytosis is a widespread and important physiological process throughout the animal kingdom, and while it undoubtedly plays a most important part in many pathological conditions, the question of an active destructive warfare waged by the body cells against the micro-organisms of disease must still be considered an open one." (*Medical News.*)

Whatever may be the final verdict with regard to the antagonism of the phagocytes to disease germs generally, it appears to be clear that their proportion and their energy are in

* Loc. cit.

direct relation with the vigor of the organism, and dependent upon the same sustaining conditions.

Sir William R. Grove, F.R.S., the distinguished author of "Antagonism" (the subject of a lecture delivered at the Royal Institution of Great Britain, April 20th, 1888), after alluding to Professor Metschnikoff's theory, says :

"Let us now consider the external life of animals. I will take as an instance, for a reason which you will soon see, the life of a wild rabbit. It is throughout its life, except when asleep (of which more presently), using exertion, cropping grass, at war with vegetables, etc. If it gets a luxurious pasture it dies of repletion. If it gets too little it dies of inanition. To keep itself healthy it must exert itself for its food ; this, and perhaps the avoiding its enemies, gives it exercise and care, brings all its organs into use, and thus it acquires its most perfect form of life. I have witnessed this effect myself, and that is the reason why I choose the rabbit as an example. An estate in Somersetshire, which I once took temporarily, was on the slope of the Mendip Hills. The rabbits on one part of it—viz., that on the hill-side, were in perfect condition, not too fat nor too thin, sleek, active, and vigorous, and yielding to their antagonists—myself and family—excellent food. Those in the valley, where the pasturage was rich and luxuriant, were all diseased, most of them unfit for human food, and many lying dead on the fields. They had not to struggle for life, their short life was miserable, and their death early ; they wanted the sweet uses of adversity—that is, of antagonism.

"The same story may be told of other animals. Carnivora, beasts or birds of prey, live on weaker animals ; weaker animals herd together to resist, or, by better chance of warning, to escape beasts of prey ; while they, the herbivora, in their turn are destroying vegetable organisms.

"I now come to the most delicate part of my subject—viz., man (I include women of course). Is man exempt from this continual struggle ?

"It is needless to say that war is antagonism. Is not peace so also, though in a different form ? It is a commonplace remark to say that the idle man is worn out by *ennui—i.e.*, by internal antagonism. Kingsley's 'Do-as-you-like' race—who

were fed by a substance dropping from trees, who did no work, and who gradually degenerated until they became inferior to apes, and ultimately died out from having nothing to do, nothing to struggle with—is a caricature illustrative of the matter.

"As, with food or exercise, deficiency is as injurious in one as is excess in another direction, so, as affecting the mind of communities, as I have stated it to be with individuals, the effect of a life of ease and too much repose is as much to be avoided as a life of unremitting toil. The Pitcairn Islanders, who managed in some way to adapt their wants to their supply, and to avoid undue increase of population, are said never to have reached old age. In consequence of the uneventful, unexcited lives they led, they died of inaction, not from deficiency of food or shelter, but of excitement. They should have migrated to England! They died as hares do when their ears are stuffed with cotton—*i.e.*, from want of anxiety. We have hope in our suffering, and in the mid-gush of our pleasures something bitter surges up."

"We look before and after,
And pine for what is not;
Our sincerest laughter
With some pain is fraught;
Our sweetest songs are those which tell of
Saddest thought." (*Nature.*)

With reference to heredity especially (as too commonly understood), in the face of what has been brought forward, while it has undoubted significance with reference to certain constitutional diseases, it is, notwithstanding, amenable to the same organic forces as feebleness of constitution in general; dependent more upon parental feebleness and unhealthful regimen in early life than upon specific tendency. The offspring of poorly nourished, dyspeptic parents, for illustration, are scarcely less liable to pulmonary consumption than the offspring of those affected with that disease; and the offspring of drunkards and of those who use narcotics to excess are well known to be fully as liable to insanity, epilepsy, and idiocy as they are to inebriety. Indeed, hereditary feebleness of constitution is the prevailing "predisposition" to disease, and this, associated as it frequently is with inadequate nourishment and ne-

glectful regimen during childhood, accounts in a great degree for the excessive mortality which obtains in infancy.

But in advocating more attention to personal regimen as the chief means of cultivating constitutional stamina and thus increasing the power of resistance to disease, which it is the purpose of this paper to urge, there should be no diversion from the effort to destroy the foci of disease germs and to maintain healthful surroundings. It should always be borne in mind, however, that the ability of the practical sanitarian to successfully cope with infectious disease-germs and their foci, and to maintain his own immunity, is the same as that of other persons: in proportion to the power of resistance, based upon constitutional and cherished stamina.—*Journal of the American Medical Association.*

The Clothing of Babies.—Although I own that children are now more sensibly clothed than was the case thirty years ago, it is still common to see an infant, who can take no exercise to warm himself, wearing a low-necked, short-sleeved, short-coated dress in the coldest weather. The two parts of the body—viz., the upper portion of the chest and the lower portion of the abdomen—which it is most important to keep from variations of temperature, are exposed, and the child is rendered liable to colds, coughs, and lung diseases on the one hand, and bowel complaint on the other. What little there is of the dress is chiefly composed of open work and embroidery, so that there is about as much warmth in it as in a wire sieve, and the socks accompanying such a dress are of cold white cotton, exposing a cruel length of blue and red leg. I cannot see the beauty of a pair of livid blue legs, and would much rather behold them comfortably clad in a pair of stockings. If the beauty lie in the shape of the leg, that shape will be displayed to as much advantage in a pair of stockings; if it lie in the coloring of the flesh, beautiful coloring will not be obtained by leaving the leg bare; and, from the artistic point of view, a blue *or* red stocking is infinitely preferable to a blue *and* red leg.—*From "Mental and Physical Training of Children," by Jessie O. Waller, in the Popular Science Monthly for December.*

CLOTHING IN ITS RELATIONS TO HYGIENE.*

By James F. Hibberd, M.D., of Richmond, Ind.

A number of years' observation as a general medical practitioner has led me to the conclusion that a large percentage of the people who have been the subjects of my observation dress too warmly, thereby perverting the normal functions of the skin, lessening its power of resisting the pathogenic influence of meteorological changes, and not infrequently being the initial link in the chain of morbid processes that lead to serious constitutional disturbances.

If my observations have not led me into error, the matter of the hygiene of dress in civil industrial life in temperate climates is worthy of review by some competent authority whose investigations shall have the virtue of precision, and whose conclusions shall have the force of demonstrated facts. Most of the exact and reliable consideration of clothing has been made concerning soldiers, sailors, miners, and others who are exposed to severe bodily exercise in widely varied meteorological conditions, and for these classes the quality, make up, and quantity of clothing for various surroundings have been fairly settled ; but the requirements of these classes by no means measure the needs of people pursuing the ordinary vocations of industrial civil life.

Clothing of the civilized peoples of temperate latitudes should fulfil a tripartite rôle, to wit : First, it should meet the just demands of modesty ; second, it should satisfy the cultured æsthetic taste in dress adornment ; and, third, it should protect against meteorological vicissitudes—the cold of winter, the heat of summer, and humidity at all times—snow, rain, and fog in their season.

Of these, only the protection of the body against cold in excess comes within the purview of this paper for consideration, not because modesty and adornment in dress have no

* Read before the American Public Health Association, at Brooklyn, N. Y., October 22d, 1889.

claims to the attention of the hygienist, but because in this connection their effect is ancillary.

The prevailing idea among the laity, largely shared by physicians, is that the point to be aimed at in determining upon appropriate clothing is to be certain that it will sufficiently guard against cold without undue hindrance to the motility of the body, little or no attention being bestowed on the possibility of overheating the skin, and still less thought of the evils such overheating may inaugurate.

The nature and importance of our dermal exterior in its influence on health is tersely stated by a distinguished member of this association, who, in writing on hygiene, has this to say of the skin ("Principles of Hygiene for the School and the Home," by Ezra M. Hunt, A.M., M.D., Se. D.): "It is, therefore, to be regarded not so much as a covering as an organ having complicated and essential relations to the whole system —an outspread sheet of membrane having offices similar to the more concealed sheets of folded vessels packed away under the name of lungs or kidneys, and having in addition a collateral relation to the various and internal physiological processes of life."

In confirmation of this delineation of the great organ through which we have physical contact with the exterior world, we need but reflect that the skin has a very complicated anatomy, is endowed with a rich supply of blood and a most complex distribution of nerves; that its physiological functions are, in addition to its exclusive operations, varied and far-reaching, assisting the lungs by eliminating about one fortieth of the carbonic acid and a portion of effete organic matter, and in like manner aiding the kidneys by secreting about one fourth of the water waste of the system.

It is obvious that such an extensive organ, so richly endowed and of which such multiple service is required, cannot have its normal functions seriously impeded, perverted, or overtaxed without producing pathological results less or more grave.

It may be laid down as an axiomatic truth that in personal hygiene the two leading factors are, first, to prevent the ingress of the external causes of disease, and, second, to establish and maintain a resistance to all causes of disease.

Clothing is not largely influential in preventing the ingress of external causes of disease, but it is among the more important agencies in increasing or decreasing the resisting power of our physical organizations to the ever-present excitors of pathological activity, and it is to this point your attention is invited.

It should be noted in this connection that no allusion is here intended to the cutaneous diseases proper, but only to such systemic disorders as may have their genesis in the skin through associated or sympathetic relations.

Among the many methods of warding off disease, much more attention is bestowed on measures to prevent the approach or contact of the causes of disease, or to destroy the causes before they have made a deleterious impression, than to establish in the system a resistance to their evil influence, and yet it is so plain as to be almost a self-evident fact that the safety of a majority of those who escape illness in any community is due to their successful resistance of the causes of illness.

It is a matter of constantly recurring observation that when a number of persons are exposed in common to a cause of disease only a fraction of them succumb to its influence, and this is true of the ordinary disorders of a locality and of endemics and epidemics as well, and the escape of the uncontaminated in such cases is due to their ability to resist the morbid impression of the pathogenic agent. Where this resistance is successful against all excitors of pathological activity, it must be accounted an index of perfect health, the *summum bonum* of all sanitary labors.

The progress of the world in all that makes for the betterment of man is more rapid and more successful in the temperate than in the torrid zones of the earth, and this largely because of the alternations of heat and cold in the succession of the seasons, and accordingly we logically conclude that these alternations are important factors in establishing and maintaining the health of man, inasmuch as on his sound health depends all his useful progress.

The logic of these facts is that a periodical exposure to a degree of cold to be measured by the sensitiveness of each individual for himself is a valuable aid in the best-adjusted evolution of man, physically and intellectually, and it may be

laid down as the rule governing the amount and duration of exposure to cold that the lowest temperature from which the exposed party will speedily and completely recuperate is the best for his highest development.

What is the rationale of hygienic dress in temperate climates for healthy people in the ordinary vocations of civil life? By ordinary vocation is meant the industry of the common laborer indoors and out, of the farmer, of the mechanic, of the clerk, of the merchant, of the teacher, and of the professional. There is a general law which will, in a comprehensive way, apply to the regulation of dress for all these classes, and yet each class and many individuals will demand modifications to correspond to the environment, the nature of the labor and exercise and the idiosyncrasy of the individual.

The qualities of appropriate clothing are chiefly that it should protect from radiant solar heat in summer without arresting the secreted heat from the body of the wearer or suppressing appropriate ventilation, and in winter prevent the unnecessary loss of heat from the body by radiation, conduction, or convection, without mischievous impediment to the circulation of the air about the skin and without cutaneous irritation.

Giving attention to winter clothing, we must bear in mind that it accomplishes our protection against low temperatures solely by preventing the too rapid waste of caloric, the product of our vital activities, and we must realize that the circulation of air under this protecting dress shall be sufficient to dilute and disperse the carbon dioxide and the organic waste secreted by the skin as the correlate of the lungs and the aqueous fluid normally secreted under the name of insensible perspiration.

If the clothing be such as to retain the carbon dioxide and effete organic matter until fermentation sets in they become a disturber of the proper functions of the skin and an agent generating disordered conditions direct or constituting a means of lowering the resisting energy of the system and thus indirectly offering it a prey to various causes of disease.

If the fabric brought into contact with the surface prove an irritant, its effect is to excite the skin to sensible perspiration, always a depressing agent when excessive, and the irritation

may go further and induce inflammation in divers manifestations of cutaneous eruptions. The skin thus over excited has its healthy vigor so weakened that the first current of fresh air that strikes it—and such a current must strike it sooner or later—disturbs the equilibrium of the economy, and by the law of vital compensations the sequel may be a catarrh, a rheumatism, a pneumonitis, a hepatitis, a peritonitis, or any other itis in the catalogue, as an immediate result, and remotely the party may become the victim of some member of the family of the pathogenic bacteria seeking a congenial soil for its own propagation.

Surely it does not require further argument to convince that any mismanagement of the skin which excites it to abnormal secretions or an excess of normal secretions, or retains in contact with it excretions that ought to be diluted and dispersed by the circulating atmosphere, is a potent cause of disorder direct, and an equally potent agent in indirectly generating multiple destructive distempers by reducing the resisting vigor of the skin against the external causes of disease.

With this showing we may proceed on the assumption that all are of one mind that to seriously disturb the physiology of the skin is to create pathology in it or in other organs of the body.

As already stated, the idea of the people now alluded to concerning dress appears to be that the one thing to be sought for is certainty that ample warmth be secured without hindrance to the proper motility of the body, with no thought, seemingly, of danger in overheating the body. With the advent of winter they resort to the heavier clothing, placing woollen fabrics in contact with the skin ; it may be the coarse, irritating flannel pressed to the surface by closely fitting overgarments, and thus excite the cutaneous glands to undue activity, causing them to secrete an excess of sebum and an excess of perspiration, which moistens and macerates the confined furfuraceous cuticle that usually falls, as a desiccated powder, into an unctuous paste, all of which augmented excretions are lodged in the closely fitting garments, rendering them still greater barriers to indispensable ventilation and intensifying their quality of retaining the auto-heat and softening and enervating the skin, the whole series of errors and evils aggra-

vated by any exercise that sharpens the respiration and hastens the circulation. This day costume, in a large portion of instances, is changed at night only by substituting bed covering for the outer garments which have been laid off on retiring, the soiled vestments next the skin being made to do uninterrupted service for a week. This management continued soon brings the skin into that tender state wherein it has been robbed of its conservative power to resist sudden changes of temperature that accident or thoughtlessness may bring to the wearer, with the almost certain sequence of catarrhs or other subdermal or internal inflammations and their possible sequels of germ diseases.

The sentiment dictating this line of dress is that we ought to be shielded from all sense of cold when exposed to a frosty air, even for ever so brief a period. Surely this is an erroneous sentiment. Without question there is a helpful tonic in the whole surface of our bodies being subjected to a proper recognition of low temperature when present. This is but a modification of the law that renders the inhabitant of a temperate climate capable of greater deeds, physical and intellectual, than his brother whose habitat has no winter, or his other brother, who is repressed in body and mind by too much winter.

If we recognize a benefit from the succession of the seasons, we must see the error of constantly guarding ourselves from the direct influence of low temperatures, because such guarding denies us the benefit of one of nature's rich blessings, and, moreover, not only thus negatively hinders our betterment, but positively injures by establishing such lessened resisting vital vigor as to lay us liable to disorder on exposure to low temperatures that we unavoidably encounter through thoughtlessness or accident.

To illustrate the error of dress and its pathological sequels, let us consider a hypothetical case, somewhat overdrawn to make selected points more conspicuous.

Pater and Materfamilias Blank were converts to the doctrine that no person should be permitted to feel the cold, and accordingly the mother availed herself of every device to shield the children from contact with fresh, cold air, swaddling them during the day and at night encasing them in flannel combina-

tion suits, with footlet attachments, that covered them completely from toe to chin, lest in their reflex, restless kicking to escape from overheating bed covers a breath of fresh air should reach an unprotected spot of surface. As a matter of fact children in bed require much less covering than adults, and would probably never in health wriggle from under cover while asleep, if the cover were not excessive.

Mrs. Blank, in her affectionate unwisdom, forbade her six-year-old son a romp in the yard with his dog in a centigrade zero atmosphere unless he incased his already well-protected feet in overshoes, his hands in mittens, his ears in muffs, and add a topcoat to his superabundant clothing. The romp of the boy under such surveillance had the auto-heat and secretion of his cutaneous glands augmented and confined in juxtaposition with his skin, softening its surface and relaxing its resisting vigor, so that next day, while his mother was absent shopping, he slipped out, forgetful that he was minus overshoes, mittens, ear muffs, and topcoat, and watched other boys playing hop-scotch on the sidewalk for twenty minutes; sequel on the morrow, tonsillitis.

This son's older sister, just making her *début* in society, had been trained to mischievous care against cold by her parents, and had suffered from catarrhs at almost every accidental exposure in the past; she was invited to a birthday anniversary party of her young friend, and in evening dress lingered in the unwarmed conservatory with an admirer until quite chilled, followed by a more general and more intense and prolonged catarrh than usual, which broke down the last resisting barrier to the bacillus tuberculosis, which now began its perfect work, and carried the young lady to her premature grave in a twelvemonth.

The father was a well-developed man of fifty years. An evening alarm, indicating that his store was on fire, started him off without thought of his wraps, and when he found it was a neighboring premises and not his own that was burning, he stood admiring the daring dexterity of the firemen fighting the flames, until a sense of chillness admonished him of his unwonted exposure; then hastily returned to his home to find on the morrow himself the subject of pneumonia, which proved mortal in a fortnight.

Mrs. Blank herself, whose power of resisting disease had been weakened by excessive clothing long continued, was overcome with grief, and speedily sank into a hopeless invalidism, her increased apprehension of the evil of cool air to her skin confining her to warm rooms and taxing her ingenuity to provide protection from the imaginary atmospheric currents of her apartments.

It should be remembered that it is not the insufficiently dressed persons who catch cold, but the superabundantly dressed. The inadequately dressed person suffers from morbid conditions growing out of the depressing influence of cold, but it is not catarrh, and as there is rarely, perhaps never, a continued insufficiently clothed person who does not also suffer from lack of nutritious food and other necessaries of health, it is not easy to ascribe to each pathogenic factor its exact share in causing the condition observed.

Every observant person who visits the poverty quarters of a city has witnessed sundry of the inhabitants of divers ages passing along on the cold earth—the writer has seen them on the frozen ground—with bare feet and thin garments, but they do not contract catarrh, albeit a person accustomed to protected feet and suitable clothing from a like exposure would probably have been seized with some mortal distemper.

In further elucidation of this view the following real occurrence is presented : Some years ago three girls, cousins, servants in neighboring families, went out together on an early winter evening to call on a relative. During their stay a squall of rain and snow covered the streets with slush. The girls were without overshoes, and reached their homes with feet thoroughly soaked and chilled. The next evening one of them called at my office with a severe sore throat, and in tears bemoaned her fate, saying that she was continuously careful of herself, especially thoughtful to protect her feet, never going on to the damp ground without overshoes, and always guarding them with rubbers while scrubbing ; her cousins, on the contrary, were reckless in their exposure of themselves, tramping over the wet ground and doing their scrubbing with bare feet, and now all came home in the slush together, and while her cousins did not suffer at all, she was nearly choked with an inflamed throat. These cases do not establish a doctrine,

but they will illustrate my point, and they suggest a moral touching habit in dress.

In submitting this dissertation there is no pretence of having demonstrated a theorem, but simply announced an opinion, its true intent being to call attention to what are conceived to be wrong views of clothing in its relations to hygiene, leading to dangerous practices in dress by a large fraction of the population in this latitude. This opinion is not the result of theorizing, but has been pressed upon me by having to deal with the consequences of errors in this behalf fallen into through mistaken ideas regarding the true rôle of the skin in the human animal economy.

It seems time that the relation of clothing to the health of the people of temperate climates engaged in civil industries should be reviewed, and the points for investigation may be summarized thus—viz. :

1. The popular and professional estimate of the hygiene of the skin is much below its real importance.

2. The physiology of the skin cannot be largely interfered with without endangering the general health.

3. One of the most influential factors in the sound health of man is to establish and maintain in his organization a resisting power to the causes of disease.

4. The tendency is to overdress, enervating the skin and curtailing its power, and thereby the power of the whole system, to resist the causes of disease.

5. A proper exposure of the surface of the body to environing low temperature is a valuable general tonic.

6. Ventilation of the skin is indispensable to good health.

7. Habit may enable one to bear wide differences in clothing under similar surroundings without detriment, and this should impress the necessity of cultivating correct habits of dress.

COFFIN NAILS.—In some parts of the West cigarettes are quite commonly referred to as "coffin nails." This is by some considered unjust to coffin nails, which are, in their way, useful and even necessary articles.

CEMETERIES IN THEIR RELATION TO THE POTABLE WATER SUPPLY OF THE CITY OF NEW YORK.

By Robert Grimshaw, Ph.D., C.E.

The State Board of Health, through its engineers, has made a thorough examination of the water-sheds from which come the water used for drinking in New York City, and has established around every lake, pond, or reservoir adjacent to every spring, stream, or natural water course, a marginal zone having a width of 50 feet around all lakes, ponds, and reservoirs, and 30 feet adjacent to the tributaries. Within this zone it is intended to exclude every kind of contamination above or below the surface. The Board has also established a secondary zone of 200 feet wide around lakes, ponds, and reservoirs, and 100 feet on each side of tributaries, within which it is the intention to prevent defilement of surface soil and subsoil, due restrictions having been made as to the manner of maintaining sources of actual or possible pollution. Solid organic wastes must be retained upon the surface of the ground or transferred by natural agencies over such distances as will render their entrance into the waters highly improbable. The Board of Health, of course, recognizes that the zone should in theory be of a varying width, according to the geological or topographical conditions : thus, for rocky or other impervious strata covered by only a fine layer of very porous material, like gravel, or for cases where the entire soil is of such porous substance, the distance should be increased. The reason why this zone of safety is narrower in the case of streams than in that of lakes into which they flow is that it is supposed that in the case of streams the material will have time to be purified by aëration, diffusion, etc., before it reaches the still waters.

The term "edge" of the stream is understood to be the margin when the water is highest ; and where there is a very steep bank, the edge of the bank is counted rather than that of the body of water at its foot.

These rules apply only to putrescible matter, that which is non-putrescible being left to be disposed of according to the general sense of decency of the people of the place.

The Board also suggests that in the case of dead animal matter which may be buried in the ground outside of the zone, or prohibited limits, decomposition be hastened by quicklime and other such agents. Great danger has been shown to accrue from the leachings of cemeteries, the distance to which these fluids will penetrate being very great, and it is recommended that all future interments within 250 feet of the margin of the water supply be prohibited.

There are also recommended certain restrictions as to the use of manures, especially those into which human excreta enter ; such restrictions being concerning the quantity employed, their concentration in any one place, etc.

The rules call for the abolition of all places for the deposit of human excreta within 50 feet horizontal measurement of the high-water mark of any lake, pond, or reservoir, and 30 feet of any stream ; and in the case of larger vaults these limits are extended to 250 and 130 feet respectively. All such places of deposit shall be arranged with water-tight receptacles, from which the material may be removed to some place of ultimate disposal.

The throwing of house-slops and garbage into any body of water or into any place where it will reach any body of water within the 50 and 30 feet zones is prohibited.

Stables, pig-sties, hen-houses, and the like may not be maintained within 100 feet of any lake or 50 feet of any stream.

No interment may be made within the entire water-shed within the 250 and 130 foot limits.

The Board reserves the power to extend the limits of these safety zones in any place, if it be found that, by reason of special peculiarities of soil or slope, such extension is unnecessary.

The penalty for infraction of these rules is $100.

All these regulations are good, as far as they extend, but they do not go far enough, literally or figuratively.

The horizontal limit should in many cases be doubled, to make the safety anything within reason ; and, after all this has been done, we come down to the fact that it is all working at the wrong end. We are endeavoring to lock the door after the horse has been stolen. We are not doing much more than if we were providing cholera mixture instead of preventing the spread of the disease.

We must recognize that it is within the province of the medical man and of the general scientist interested in sanitation to do three things in this line in aid of suffering humanity: First, to provide suitable remedies and treatment for those who have been made sick by their own fault, or that of others, or by causes which are usually styled (and often miscalled) "natural;" second, to prevent the occurrence of disease by such regulations as have been laid down by our State Board of Health, to prevent certain noxious matters which have been produced from reaching and harming living beings; third, to prohibit and prevent certain grades of nuisances, as cemeteries, from existing anywhere.

Of these three classes of scientific work, the first cited is first in order, least in importance. It is the most primitive, and should be followed promptly, as we progress in knowledge, by the second named, which is the first one which has in it the true scientific principle—prevention.

The first named is the province of the physician, upon a scientific basis; but it is a partial procedure without striking at the root of the evil. It is not merely local, but individual. It is a method of warfare which permits the enemy to penetrate the citadel, in order that, by a risky hand-to-hand combat (in which the defender is frequently worsted), the assailant is attacked, with the intention of driving him out. It is a method of healing corresponding to that system of fire protection which builds of the most inflammable material, and then trusts to the local extinguisher or pail of water to put down the flame before it becomes a conflagration.

The second method is that of outlying fortifications, by which the enemy is largely prevented from entering the territory defended. It is a system capable of extension as science advances, and as means are provided for its accomplishment. It is a principle which permits of extension just as the fortifications of Paris have been extended—zone after zone being thrown around the system, each one covering a larger area of territory than the one before it, and adding to the safety of all other areas which it encloses. It resembles that system of fire protection which prohibits erecting any frame building within certain limits, and while providing for the extension of such zones from time to time, reserves the right to tear down,

within a certain number of years, all frame buildings found within the fire boundaries.

The third and most advanced method of sanitation is that of entire prevention, which enters the enemy's territory, and destroys him root and branch ; which places him under a subjection from which he can never free himself. It resembles that system of fire protection in which the erection of buildings in any degree combustible and the storage of materials which are in themselves inflammable, is absolutely prohibited within the safety limits ; the standard of fire-proof construction, and the limits within which the rules are enforced, being advanced as science and means permit, and legislation can be obtained.

We should be thankful that, as regards the city of New York at least, there has been some attempt, though feeble, to bring about a state of things sanitary which shall in some measure ensure partial prevention of dangerous nuisances ; by which the hall of legislation shall in great degree replace the drug-store and the doctor's office. But our Board has not gone far enough, and there are throughout the country hundreds of cities and thousands of towns in which there has been taken no single step—however short, however feeble—in the direction of prevention rather than cure. Malaria, so called, is allowed to shake the life out of the population, the privilege of purchasing quinine being the only right accorded the inhabitants. Zymotic diseases are permitted to decimate the population with alarming regularity, and on occasion to demand and obtain even more than the terrible tithe ; and all that has been done is to encourage the education and settlement of skilled physicians, who shall combat the awful evil when it has lodged in the stronghold. All over our broad land the living are allowed to pollute the water we drink and the air we breathe, and the dead add their still more dangerous defilement. Swamps remain undrained, those who live near preferring that their resources and their life be drained instead. Excessive surface vegetation is left uncleared, aquatic vegetation allowed to multiply and accumulate ; factories, manured fields, and unswept streets and roads permitted to foul the watercourses, and the dead in cemeteries allowed to steep in the drinking-water which their temporary survivors are compelled to drink. This evil of the grave is the most crying one of the

present day. Thousands of dead are deposited within a short distance of the surface; the rains from heaven hasten and render more horrible their decay, and then carry to the living the horrible seepage laden with disease and death, all the more difficult to combat because so insidious.

The most dangerous of all organic wastes are human excreta; next, those from the various animals, and the derivatives of such manures, compounds, etc. Following these come household slops and manufacturing waste, and all of these should be prevented from harming either those who produce them or those who are compelled to absorb them.

Popular investigation and indignation have been aroused in most of our cities and in many small towns concerning the question of contamination of drinking-water by human and other excreta, the very nastiness of it seeming to be a more potent factor in bringing about a healthful state of public feeling than its danger. The disgust and feeling of apprehension are being extended to allow the consideration of nearly all of the other forms of contamination except that caused by our crude and worse than barbaric way of disposing of the dead.

There is every reason against the system of earth burial as now practised by us; nothing in its favor. It converts the forms of those whom we have loved—the forms which we still love and reverence, after the vital spark has made of them little more than a memory—it converts those, I say, into loathsome, unmentionable, almost unimaginable compounds, in which foul gases and fouler liquids struggle with each other in horrid warfare to escape from disgusting semi-solids, peopled with creatures of lowest rank and vilest presence. The fetor, the sickening appearance, the far-reaching effluvia and exhalations of the human corpse, boxed in and plunged only head deep into a porous soil, through which the rains of heaven trickle until they become a stream of death—these horrid sights, these nameless essences and unmentionable products—who shall describe, who may even picture or imagine to himself? Rotting, swelling, bursting, trickling with vile fluids, reeking with noisome gases, wriggling with creatures which never see the light—to such low pass must come the fairest, the sweetest, the dearest, the most reverenced. Can sentiment recommend, can love approve, such outrage? The essence of decay is marked upon our brow at the baptismal font, and put

to the lips of the sick and dying, who crave a refreshing and life-giving draught. On the ground of sanitation all this should be stopped now and permanently.

I do not pose here as advocating any one special method of disposition of our dead. Whether the method chosen to supplant the seepage system be incineration, desiccation, mummification, petrifaction, or some other system, old, modified, or new, it matters little, so that the horrors of the present mode are obviated and its dangers averted. What succeeds earth burial as now practised may be determined later; but that the secret terrors of the church-yard and the common burial-place be no more permitted to exist should be our firm resolve.

THE POTABILITY OF THE WATER SUPPLY OF PARIS.—There has been much discussion about potable waters by the members of the Board of Health, of the Hospital Medical Society, and of the Society of Public and Professional Health. The water that is actually distributed in Paris comes, first, from distant rivers that have been imprisoned for a longer or shorter time; second, from the Seine, the Ourcq, the Marne. The first are of good quality but of insufficient quantity; the second have to be substituted, and, unfortunately, they are absolutely worthless. What, then, will inevitably happen? From the day on which the change took place little epidemics of typhoid-fever broke out in every direction. This was the case in 1889, as also in 1887. The warm season of 1888 was fortunately a wet one, so that the water of the first class sufficed.

As Chantemesse and Widal found the typhous bacillus in the drinking-water of the Menilmontant district at the time of an epidemic reigning there, it is proved that the most important factor in the diffusion of typhoid-fever in Paris is the water that one drinks here. The best method, therefore, of preventing epidemics and of considerably diminishing the number of sporadic cases is to so increase the quantity of pure river water as to be able to furnish an abundant supply to all the inhabitants of every part of the city throughout the entire year.

The city has desired to purchase quite an important river, the Avre, which rises about one hundred and sixty kilometres

to the west of Paris. The money is ready, the working plans are completed, but, as the inhabitants of the country through which the river passes object to having their water taken from them, it will be necessary to pass a law in order to overcome their resistance.—*Paris Correspondent of the N. Y. Medical Journal.*

EARLY HISTORY OF WATER SUPPLY.—During the first century of our era the water supply of ancient Rome was so abundant "that whole rivers of water flowed through the streets." It has been estimated at 375,000,000 gallons per day, or 375 gallons for each inhabitant, and was conducted through nine costly conduits of masonry, in whose construction wonderful engineering skill was shown. Their aggregate length was 249 miles. The principal aqueducts were the Aqua Martia, erected 431 B.C., 38 miles in length, and partly composed of 7000 arches; the Aqua Claudia, a subterranean channel for 36¼ miles, for 10¾ miles a surface conduit, 3 miles a vaulted tunnel, and 7 miles on lofty arcades, with a capacity of 96,000,000 gallons daily; and the Nova Anio, which was 43 miles in length. Some of these aqueducts rose in three distinct arches, which conveyed water from sources of different elevations. In Constantinople, the capital of the Eastern Empire, the Romans left numerous subterraneous reservoirs covered with stone arcades resting on pillars. In France, also, the famous Pont du Gard aqueduct, which supplied the town of Nismes, is still an object of interest. It consists of 3 tiers of arches, the lowest of 6, supporting 11 of equal span in the central tier, surmounted by 35 of smaller size. Its height is 180 feet, with a channel 5 feet high by 10 wide; the capacity was estimated at 14,000,000 gallons per day.

India is noted for numerous ancient impounding reservoirs of vast dimensions. The Poniary reservoir has an area of 50,000 acres and banks 50 miles in extent. In Mexico and Peru the aborigines left water channels of wonderful length. The great aqueduct of Peru, built by the Incas, was 360 miles long.

The works of the Romans left nothing to be improved upon in the method of transporting water from a distance until recent times; but in the early part of this century it was found that by sinking artesian wells a supply could be obtained more economically.—*Maverick's National Bank's Manual, Boston, Mass.*

THE MEDALS, JETONS, AND TOKENS ILLUSTRATIVE OF SANITATION.*

By Dr. HORATIO R. STORER, Newport, R. I.

(*Continued from page* 59.)

THE following additional famine pieces have recently come to my knowledge :

a. Poitiers, France.

400ª. Obverse. The arms of the city upon sheaves of wheat.

Reverse. A long and suitable inscription, to the effect that Antoine François Boule de Nanteuil, Governor of the Province, averted a disastrous famine in 1786. Cat. des poinçons, etc., p. 300, No. 62. Unknown to P. and R.

b. Paris.

470ª. Obverse. Head of Louis XVIII. Andrieu F.

Reverse. Providentia Principis. Exergue : Advecta In Regnum Annona.Peregrina. MDCCCXVII. Gayrard F. *Ibid.*, p. 404, No. 41. Unknown to P. and R.

c. England.

650ª. Obverse. Monopolists selling wheat from vessel to starving people.

Reverse. Similar, but wheat sacks are landed. 34.

Woodward ninety-fifth sale, May 21st–25th, 1888, No. 549. Unknown to P. and R.

d. Ireland.

650ᵇ. Obverse. Sligo.Soup Ticket. (1798.)

Reverse blank. Brass. 12.

* The previous portions of this paper will be found in THE SANITARIAN for May, July, August, October, 1887 ; February, April, July, August, November, 1888 ; February, March, April, June, September, November, 1889, and January, 1890.

Frazer. The Medallists of Ireland and their Work. *Journal of the Royal Historical and Archæological Association of Ireland*, January, 1888, No. 318. Unknown to P. and R.

e. British West Indies.

659ª. The Hurricane at Barbadoes, August 11th, 1831. 2437 lives lost and £2,311,729 worth of property destroyed. Silver. 24. Haines Cat., October 17th–18th, 1888, No. 1107. Unknown to P. and R.

f. Sicily (*earthquake of* 1693).

695ª. Memor. Siciliae D. 9 Et 11 Jan. A(nno).M(undi). MDCXCIII Horr. terrae mot. Convvls.Syrac.Avgvs.Catan. Messin etc. Silver. 35 mm. Schulman Cat., May, 1889, No. 1066. Unknown to P. and R.

Additions to medallist writers upon General Epidemics are these :

Hippocrates. "On Epidemical Diseases." Will be mentioned in Section XIII., Climate.

Dr. Elisha Harris (1824–84), of New York.

"Pestilential Diseases and the Laws which Govern their Propagation," Albany, 1858, 8°. Will be given in the present number of THE SANITARIAN.

Under The Plague there may be entered

a. Great Britain.

Dr. F. Forbes. "Thesis on the Nature and History of Plague as Observed in the N. W. Provinces of India," Edinburgh, 1840, 8°.

710ª. Gold medal from the University of Edinburgh for the above.

Dr. Richard Mead, of London. "De Peste," London, 1723. "A Discourse on the Plague," London, 1744, 8°. "Dissertazione della natura e rimedj della peste," Venezia,

1743, 8°. "Verhandeling van den aart en eigenschap der besmettinge van de pest," etc., Leyden, 1721, 12°.

Described under General Epidemics, No. 699.

Dr. Thomas Sydenham. Appendix on The Plague to second edition of his "Methodus Curandi Febres," 1668. Already described, No. 700, under General Epidemics.

b. France.

Dr. Ambroise Paré. "Traicté de la peste," etc., Paris, 1568, 12°. Described, Nos. 1161–62 and 1183, under Syphilis and Leprosy.

c. Germany.

No. 713. Von Berchthold's medal is not mentioned by P. and R. in either edition of their "Pestilentia in nummis" (1880 and 1882), though added, as an "anhang," to a reprint, without date, of a portion of the former (page 16, No. 50).

Dr. Joachim Camerarius (1534–98), of Nuremberg. "De ratione preservandi a pestis contagione tam imminente quam exoriente loca quaelibet." Norinberg, 1583, 8°.

713[a, b, c, d]. There are four medals described by Duisburg (pp. 107, 108, cclxxxviii., Nos. 1, 2, 3, 4), of which but one is mentioned by Rudolphi (1829, p. 30, No. 115), and Kluyskens (vol. i., p. 176). These I shall give in another connection when describing the medals of medical colleges, Camerarius having been the founder of that at Nuremberg. There is the engraving of still another in the library of the Surgeon-General's office at Washington.

Dr. Joannes Andreas Murray, of Göttingen. "De febribus epidemicis Romae falso in pestium censuum relatis." Göttingae (1782), fol. Described under Inoculation, No. 917.

Dr. Aureolus Philippus Theophrastus Paracelsus (1493–1541), of Hohenheim.

726[a to g]. "Vom Ursprung der Pestilentz und ihren Zufallenden Kranckheiten," Basel, 1575, 12°. Rudolphi (1829, pp. 119, 120, Nos. 495–98) gives four medals; Kluyskens (vol. ii., pp. 290, 291) gives five; and Duisburg (pp. 99, 100, cclxviii, Nos. 1–7) gives seven.

d. Italy.

Dr. Nicolo Massa, of Venice. "Ragionamento . . . sopra le infirmità che vengono dall' acre pestilentiale del presente anno 1555." Venetia, 1556, 16°. "Liber Nicolai Massae de peste contractus," etc., Londini, 1721, 12°. Described under Syphilis, No. 1175.

In describing the medals of Dr. J. M. Toner, of Washington, it was stated that No. 27, one of the prize medals founded by that gentleman, was for the University of Pennsylvania. This is not the case. It is for the Jefferson Medical College.

XI. Military and Naval Hygiene.

A. The United States.

Miss Clara Barton (1830–), "the American Florence Nightingale," President of the Association of the Red Cross.

1227. A gold medal, with the coats-of-arms of the nations within the compact, given in 1882, by the Comité International De Secours Aux Militaires Blessés, of 1870.

"History of the Red Cross," 1885, p. 199.

Miss Barton has received other medals still, descriptions of which have been promised me, in season, I trust, for the next instalment of this paper.

Rev. Dr. Henry Whitney Bellows (1814–82), of St. Louis, President of the United States Sanitary Commission.

1228. Obverse. Head of the Emperor, to left. Inscription: Napoleon III—Empereur.

Reverse. Two winged figures bearing a tablet surmounted by a wreath. Upon tablet: Commission Sanitaire | Des Etats Unis Inscription: Exposition Universelle De MDCCCLXVII a Paris Exergue: Grand Prix Gold. 40.

1229. Obverse. Within a beaded circle, the Geneva cross. Inscription: Secours Aux Blessés Militaires (rosette)

Reverse. Within a similar circle, a space with milled edges; upon which: A Mr H. W. Bellows. Above, Paris Below, 1867 Inscription: Exposition Et Conferences International Gold. 22.

I have impressions of both these medals through the kindness of the widow of Dr. Bellows, in whose possession they are.

Dr. H. I. Bowditch, of Boston. "A Brief Plan for an Ambulance System for the Army of the U. S., as Drawn from the Extra Sufferings of the Late Lieutenant Bowditch and a Wounded Comrade." Boston, 1863, 8°.

Dr. Bowditch has already been mentioned under Sections I.; V., Drainage; VIII., Diet; and X., Diphtheria and Consumption. He will again be referred to under XII., Climate.

Dr. Thomas Wiltberger Evans (1823–), now of Paris. "Essais d'Hygiène et de Thérapeutique Militaire a la Commission Sanitaire des États-Unis." 1865, 8°. "Sanitary Institutions during the Austro-Prussian-Italian Conflict." 1868, 3d ed.

"Histoire de la Commission Sanitaire des États-Unis."

"Les Institutions Sanitaires pendant le conflict Austro-Prussien."

"De la découverte du caoutchouc vulcanisé et de la priorité de son application à la chirurgie civile et militaire."

"La Commission Sanitaire des États-Unis, son origine, son organisation et ses resultats. Avec une notice sur les hôpitaux militaires aux États-Unis et sur la réforme sanitaire dans les armées européennes." Paris, 1865, 8°. Several editions.

"Essais d'hygiène et de thérapeutique militaires présentés a la commission sanitaire des États-Unis." Paris, 1865, 8°.

"Report on Ambulance and Sanitary Material, Class VI., Group II., Paris Exposition, 1867." Paris, 1867, 8°.

"Les Institutions Sanitaires pendant le conflict austro-prussien-italien, suivi d'un essai sur les voitures d'ambulance, et d'un catalogue de la collection sanitaire américaine de l'auteur." Paris, 1867, 8°.

"Sanitary Institutions during the Austro-Prussian-Italian Conflict; Conferences of the International Societies of Relief for Wounded Soldiers; an Essay on Ambulance Wagons; Universal Exhibition Rewards and Letters; Catalogue of the Author's Sanitary Collection." Paris, 1868, 8°.

"History and Design of an Ambulance Wagon Constructed in Accordance with Plans Furnished by the Writer." Paris, 1868, 8°.

"Report on Instruments and Apparatus of Medicine, Surgery, and Hygiene; Surgical Dentistry and the Materials which it Employs; Anatomical Preparations; Ambulance Tents and Carriages; and Military Sanitary Institutions in Europe." Washington, 1868, 8°.

"History of the American Ambulance Established in Paris during the Siege of 1870–71, Together with the Details of its Methods and its Work." (Sanitary Associations during the Franco-German War of 1870–71, vol. i.) London, 1873, 8°.

"Dental Surgery and the Materials which it Employs, Forming Part of a Report on Class XI., Group II., Paris Exposition, 1867, Prepared for the Imperial Commission." Paris, 1868, 8°.

Gold medal from International Societies of Relief, Paris Exposition, 1867, presumably like No. 1229. It was given in honor of the American Sanitary Collection, of which Dr. Evans was practically the originator.

Dr. John B. Hamilton (1847–), of Chicago, Supervising Surgeon-General of the United States Marine Hospital Service, Washington. His name is inscribed upon the large medal of the International Medical Congress of 1887, as its Secretary-General. It has already been given, No. 906.

Dr. Elisha Harris (1824–84), of New York. "The Annual Report of the Physician-in-Chief of the Marine Hospital at Quarantine." Albany, 1857, 8°.

1230. A bronze medal from the Imperial Commission at the Paris Exposition of 1867, for railway ambulance.

1231. Also, from the International Societies of Relief, already mentioned.

Dr. Harris might have been also referred to in previous Sections, under Water Supply, General Epidemics, Vaccination and Cholera, and will be again under Climate, Registration, and Hospitals.

Dr. Isaac Israel Hayes (1832–81), of New York. Arctic explorer.

1232. Founders' medal of Royal Geographical Society, 1867.

1233. Gold medal of Paris Geographical Society, 1869.

Surgeon Samuel Horsley (1790–1821), U. S. N.

1234. Silver medal, by Act of Congress 1820, for services

at the battle of Lake Erie. I learned of this from Dr. Horsley's grandson, Dr. Jacob H. Hartmann, through Dr. John Morris, of Baltimore. It is a fac-simile of the gold one conferred upon Commodore Oliver Hazard Perry, figured by Loubat, a bronze copy of which is in my collection.

Dr. Samuel Gridley Howe (1801–76), of Boston. Surgeon in Grecian Army, 1824–30; President of the Polish Relief Committee and prisoner-of-war in 1831; and participant in the Cretan-Turkish War of 1867.

1235. Obverse. Laureated head of the Emperor Franz Josef to right. Exergue: J. Tautenhayn.

Reverse. Vienna seated, with mural crown and shield. Before her, a nude winged genius with wreath, etc. Exergue: Weltausstellung 1873 | *Dem Fortschritte*

Vienna Exposition Report, State Department, Washington, vol. i., figured.

The "Medal of Progress" of the Vienna Exposition, conferred upon Dr. Howe for his services in educating the blind. It can be compared with the "Medal of Merit," No. 1066, granted to Dr. J. M. Toner, of Washington, upon the same occasion.

Dr. John Homans, Sr. (1793–1868), of Boston, an officer of the Massachusetts Humane Society (life-saving).

1236. Obverse. Within a circle, in background, mountains and a wreck. In front, a hut upon which Succour, and a crew dragging up their lifeboat. Inscription: Humane Society of Massachusetts. | Instituted, 1785. To left, C. Schollay Del.; to right, C. C. Wright Sculp:

Reverse. Within oak branches bound by ribbon: F. Parkman D.D. Pres: | R. G. Shaw / D. P. Parker } V. Pres: C. Amory Treasr: | J. Homans M.D. C(orr). Sect: | S. Hooper R(ec). Sect: | E. H. Robbins Trust(ee)s: | Abbott Lawrence. | Robert B. Forbes. | David Sears. | S. Austin | F. B. Crowninshield. Exergue: C. W. Wright. Bronze.

There are various grammatical peculiarities about this medal which fifty years hence may create inquiry. It is in my collection.

1237. Obverse. A massive shield. Upon its left field, an Indian, erect, with robe, bow and arrows. Upon right, the

Stars above the Stripes. Above, a star surmounting a scallop-shell. Below, a scroll with E Pluribus Unum. Inscription: Sub Libertate—Quietem (a portion of the State motto of Massachusetts). In exergue, B. Wyon—London.

Reverse. Inscription: Officers of the Institution | 1854 In field, clasped hands; below which, David Sears—President | Abbott Lawrence—I Vice Pres^{t} | John Homans. II Vice Pres^{t} | Charles Amory—Treasurer | S. K. Lothrop—Corresponding Sec^{y} | Sam. Hooper—Recording Sec^{y} | Trustees R. Bennet Forbes | F. B. Crowninshield | George B. Upton | J. Mason Warren (also a Boston Physician) | Francis Bacon | William Amory

Upon rim, in script, Humane Society of Massachusetts—1786 (reversed). Bronze. 37.

This is in my own collection.

Surgeon Lawrence Kearney, U. S. N. Congressional medal for services in a naval action during the War of 1812.

I have learned of this from Medical Director T. J. Turner, U. S. N.

Surgeon Elisha Kent Kane (1820–57), U. S. N., the Arctic explorer.

1238. Obverse. View of discovery of "open" polar sea. No inscription.

Reverse. Arms of New York, surmounted by eagle on globe, within wreath of laurel. Gold, electrotype. 50.

Snowden, "Subnational Medals," in his "Medallic Memorials of Washington in Mint of the United States," p. 100, No. 6; Homes, "On Medals," *Historical Magazine*, vii., 1863.

This is in the Collection of the United States Mint. It was struck by the State of New York, in accordance with resolution of March 18th, 1856. It is stated by Homes that no duplicate was made, that there was no motto upon the State arms, or other inscription, all this having to be afterward engraved upon the edges, and that no provision was made for copies in any other metal. Electrotypes of what I presume to have been this medal have, however, occasionally appeared, as at the Wood sale, No. 1638; the Haseltine seventy-seventh, March, 1884; the H. eighty-third, January, 1885; and the Balmanno sale, in June of the latter year.

1239. Obverse and reverse of similar character, but medal smaller. By Tiffany & Co. Silver, bronze. 38.

Anthon Cat., October, 1884, No. 881 ; Haseltine eighty-third do., January, 1885 ; Balmanno do., June, 1885. This rare medal is in my collection.

1240. Obverse. Head, to right. Below, upon a panel, a polar scene. Upon each side, two American flags. Inscription : Dr. Elisha Kent Kane, The Great Arctic Explorer, U. S. N. Exergue : G. H. Lovett—N. Y.

Reverse. Within two palm leaves, crossed, Masonic emblems and the floor of a temple. Above, in clouds, the radiant eye, etc. Externally, a double chased circle. Within it, above : Non Nobis Solum Sed Toto Mundo Nati Below, MDCCCLIX. Silver, bronze, white metal, tin, brass. 32.

Marvin, *American Journal of Numismatics*, July, 1878, p. 8, ccxci. ; *Ibid.*, " Medals of Masonic Fraternity," p. 116.

This medal, said to have been struck by the Kane Lodge, of New York, exists with both thick and thin planchet. I have them both. It is also in the Lee Collection.

1241. Obverse. Nude bust to right. Beneath, Key F. Inscription : Dr. E. K.—Kane.

Reverse. Born in Phila. Pa. | Feb. 3, 1822, | Commander of the | Grinnell Arctic Expedition | May 30, 1853, | Died Feb. 14, 1857. Bronze, brass, copper, white metal. 24.

Snowden, *loc. cit.*, p. 115, No. 46 ; Fonrobert Cat., No. 5000.

The above medal is wrong as to the dates both of birth and death. The former should be, February 3d, 1820, and the latter, February 16th, 1857. It is in the Collection of the United States Mint. I have it both in white metal and bronze.

1242. Obverse. Same as preceding.

Reverse. Laurel boughs tied by ribbon. Above, a star. On either side, with letters above each other, F. C. K E Y | & S O N S. In field, MEDAL | DIE SINKERS | 329 | ARCH ST. | PHILADA.

Silver [only two struck], bronze, copper, brass, white metal, tin. 24.

I have this in white metal, copper and brass.

1243. Obverse as preceding.

Reverse as obverse, but incused. White metal. 25.

R. C. Davis Cat., January 22d–26th, 1890, No. 1856.

1244. Obverse as the last but one.

Reverse plain. Rim milled. Tin.

Bushnell, "An Arrangement of Tradesmen's Cards," etc., New York, 1858, p. 47.

1245. Obverse. Bust of Dr. Kane, over a view of Arctic scenery, probably similar to obverse of 1236.

Reverse. A broad border, with eagle, flying mottoes, stars and trophy. Within, bust of Washington to right. Beneath neck, C. H. L[OVETT]. Inscription: GEORGE WASHINGTON. White metal. 32.

Wood Cat., February 25th–29th, 1884, No. 394.

"Unique combination in a trial piece."

1246. Obverse. "Head incused and a number of inscriptions of political significance, making up a queer conglomeration of words. No doubt unique." Tin.

Frossard sixteenth Cat., October, 1881.

1247. Obverse. Very large bust in high relief; by Coutts. Inscription: + Elisha Kent Kane + | Born at Philadelphia. Febru^ary. 3. 1820 + | + Died. At. Havana. February. 16. 1857. Within pearled circle and olive wreath border.

Reverse plain. Copper shell, electrotype. 92.

R. C. Davis Cat., January 22d–26th, 1890, No. 1857.

Dr. Kane received

1248. The Queen's medal to Arctic explorers between 1818 and 1855. Grueber, "Guide to the English Medals in the King's Library, British Museum," 1881, p. 138, No. 602. Also, the Founder's medal of the Royal Geographical Society of London, in 1856, similar to No. 1232, and the gold medal of the Société de Géographie, in 1858, similar to No. 1233.

There was also a medal voted to Dr. Kane by Congress in 1857, but this had not been struck at the time of the publication of Loubat's work in 1878.

Loc. cit., "The Medallic History of the United States of America, 1776–1876," vol. i., p. xxvii.

In this connection I may state that the medals of Arctic exploration form an interesting group by themselves, well worthy of special collation. Among them would be included the

medal "Presented by the British Residents of New York," in connection with the first Grinnell Expedition in 1851.

Dr. John Morgan (1725–89), F.R.S , of Philadelphia. In 1775 Director-General of the Military Hospitals and Physician-in-Chief to the American Army. "A Vindication of his Public Character in the Station" above indicated. Boston, 1777, 8°. Dr. Morgan received

1249. A gold medal from the College of Philadelphia, subsequently the University of Pennsylvania, for a "Dissertation of (*sic*) the Reciprocal Advantages of a Perpetual Union between Great Britain and her American Colonies."

Of the history of this medal, founded by John Sargent, M.P., of London, I have received an interesting account from Mr. John W. Jordan, Secretary of the Historical Society of Pennsylvania.

Dr. Morgan might also have been mentioned under Section X., Inoculation, as he wrote "A Recommendation of Inoculation According to Baron Dimsdale's Method." Boston, 1776, 8°.

Dr. Benjamin Rush, of Philadelphia. In April, 1777, appointed by the Continental Congress Surgeon-General of the Hospitals of the Middle Department, and in July, Physician-General.

"The Results of Observations made upon the Diseases which Occurred in the Military Hospitals of the United States during the Revolutionary War," Medical Inquiries and Observations, vol. i.

"Influence of the Military and Political Events of the American Revolution on the Human Body," *ibid.*

Dr. Rush also edited Pringle "On Diseases of the Army." 1810.

Already described under Section X., Yellow-Fever, etc.

Dr. James Marion Sims (1813–83), of New York. In 1870 organized in Paris the Anglo-American Ambulance Corps.

1250–51. Dr. Sims received two medals from the Italian Government, and the Iron Cross of Germany.

Dr. J. M. Toner, of Washington, D. C. "Notice of Military Hospitals in the District of Columbia in the Civil War." Annual oration before the Medical Society of Washington,

D. C., 1869. Dr. Toner's medals have already been described, and he will be again referred to.

Dr. Joseph Warren (1741–75), of Boston, Major-General Continental Army.

1252. Obverse. The battle and death of Warren, from Trumbull's picture. Inscription: BUNKER HILL | 17 JUNE | 1775

Reverse. BATTLE OF BUNKER HILL | DEATH OF GEN. WARREN | 17 June 1775 | —BOSTON | MOURNS HER GALLANT SON Exergue: Oak branches crossed. 28.

In the possession of Dr. J. Collins Warren, of Boston, the great-grand-nephew of General Warren, to whom I owe an impression of the medal.

1253. Obverse. Same device; beneath, MITCHELL F^{T} — BOSTON. Inscription: BUNKER HILL | 17 JUNE 1775

Reverse. Within clouds, the monument, irradiated. Inscription: SUCCESS TO THE FAIR | SEPT 8 1840 White metal, brass, copper, tin. 27.

Bushnell, *loc. cit.*, p. 110.

This very rare medal is in my collection.

1254. Obverse, as last.

Reverse. Inscription, outside of the clouds: Commenced 17 June, 1825—Completed 17 June, 1843. Tin. 27.

Ibid., p. 110.

1255. Obverse. Head of Warren, facing. Inscription: JOSEPH WARREN. BORN 1741. KILLED JUNE 17. 1775.

Reverse. The monument and grounds, as originally. Inscription: BUNKER HILL BATTLE GROUND 1875. White metal. 23. The dies by Randall.

Holland, "Centennial Medals," *American Journal of Numismatics*, January, 1876, p. 63, No. V.

Coin Collectors' Journal, I., April, 1876, p. 68, No. XXXVIII.

1256. Obverse. The death of Warren. Inscription: *BATTLE OF BUNKER HILL.* | JUNE 17, 1775.

Reverse. The monument and old fence. Inscription: CENTENNIAL ANNIVERSARY | JUNE 17. 1875. Bronze, brass, copper, white metal. 17.

Holland, "Centennial Medals," *American Journal of Numismatics*, January, 1876, p. 63, No. VII.

Coin Collectors' Journal, I., April, 1876, p. 68, No. XXXIX.

This is in my collection.

1257. Obverse. The death of Warren. Above, BUNKER HILL Below, 17 JUNE. 1775. MITCHELL F^T.

Reverse. [1840] Head to left. Above, WILLIAM HENRY HARRISON. Below, 26 stars in a semicircle. White metal. 27.

Crosby Cat., No. 649.

1258. Obverse. Laurel boughs tied by ribbon. In field, shield surmounted by blazing sun, and flanked on side by two flags. Upon shield, JUNE | 17^TH | 1775 Above it, WARREN.

Reverse. Bunker Hill, the monument and the city of Charlestown. Inscription: BUNKER HILL White metal. 17.

Holland, "Centennial Medals," *American Journal of Numismatics*, January, 1876, p. 63, No. VIII.

Coin Collectors' Journal, I., April, 1876, p. 68, No. XL.

This is in my collection.

The medal of Dr. John C. Warren, the nephew, has been previously described in Section I.

Dr. Jonathan Mason Warren (1811–67), of Boston. A grand-nephew of General Joseph of the Revolution, son of Dr. John C., and father of the present Dr. J. Collins Warren, he was an officer of the Massachusetts Humane Society, and is mentioned in this connection for the same reason as was Dr. John Homans, Sr., of Boston. His name is upon the second of the medals described in connection with the latter gentleman, No. 1233.

Incidentally, in previous Sections, medals have been described relative to the present subject; as the Yellow-Fever medal presented by the city of Portsmouth, Va., to the surgeons at the United States Naval Hospital, and those conferred, for similar reason, upon Surgeons Harrison and Williamson by the French Government.

There are other American physicians who deserve to be mentioned in connection with military and naval hygiene. I thus far know of the following:

Dr. Gurdon Buck (1807–77), of New York. Bronze medal from International Societies of Relief (Paris Exposition, 1867), for fracture apparatus. Presumably similar to No. 1231.

Dr. Courtney James Clark (1816–), of Selma, Ala.

1259. Obverse. A battle; in foreground, the palmetto flag, upheld. Inscription: Vera Cruz Contreras Churubusco Chapultepec Cabila De Belen Exergue: a star.

Reverse. Within a circle a palmetto-tree, above which a soaring eagle, bearing scroll on which Pluribus Unum. Above, Dickinson Butler Gladden At base of tree, on either side, pineapples and shields, on which 1855 & 1856. Midway: To.The | Palmetto.Regiment. At sides, South Carolina. Beneath, engraved, Surgeon C. J. Clark. Inscription: Animis Opibusque Paratis Dum Spiro Spero.

Gold, 24 carats, 49 dwts. 30.

Conferred by the State of South Carolina upon Dr. Clark, who was surgeon of the Palmetto Regiment during the Mexican War.

I owe plaster impressions of this medal to Dr. Clark.

Dr. Gardner Quincy Colton (1814–), of New York. Bronze medal from International Societies of Relief, 1867, for apparatus for inhalation of nitrous oxide gas. Presumably similar to No. 1231.

Dr. Edward A. Crane.

1260. Silver medal from International Societies of Relief, 1867.

Dr. Josiah Crosby (1795?–1875), of Manchester, N. H.

Bronze do., do., for invalid bed. Presumably similar to No. 1231.

Dr. James K. L. Duncan (1845–), of De Witt, Neb.

1261. Service medal, U. S. Navy, 1864.

Surgeon Francis L. Galt, U. S. N., of Upperville, Fauquier County, Va.

1262. Medal from French Government at close of war.

I was informed of this by the late Dr. James L. Cabell, of the University of Virginia.

Dr. Erasmus Darwin Hudson (1805–80), of New York. "Artificial Limbs for the United States Army and Navy." (New York, 1865), 8°.

Bronze medal from Imperial Commission at Paris Exposition

of 1867, and International Societies of Relief, for artificial limbs. Presumably similar to Nos. 1230 and 1231.

Dr. Charles Thomas Jackson, of Boston. The discoverer of sulphuric ether as an anæsthetic. Already mentioned under Section II., Water Purification, No. 130.

Dr. J. Langer. Bronze medal from International Societies of Relief (Paris Exposition, 1867), for extension bed. Presumably similar to No. 1231.

Dr. Milton M. Latta (1822–), of Goshen, Ind. Bronze medal from International Societies of Relief (Paris Exposition, 1867), for fracture bed. Presumably similar to No. 1231.

Dr. William Thomas Green Morton (1819–68), the practical applicator of sulphuric ether as an anæsthetic to surgical practice.

1263. Obverse. A head, in relief, enclosed in a wreath of oak branches. Dumarest F. Inscription : Institut National de France.

Reverse. Académie des Sciences ; Prix Montyon Médecine et Chirurgie ; Concours de 1847 et 1848 : Wm.T.G.Morton 1850. Gold. 64.

Proceedings of the Massachusetts Historical Society, January, 1870, pp. 197, 198.

This medal is now preserved by the Massachusetts Historical Society. For its description I am indebted to Dr. S. A. Green, of Boston.

Dr. Paul Fortunatus Mundé (1846–), of New York. Was Battalion Surgeon of Bavarian Army in war of 1866, with rank of first lieutenant, but in charge of battalion of one thousand men, and received Bavarian cross of merit for special services as volunteer medical officer.

In Franco-German War of 1870–71 received the two following medals, both of which were given only to those actually in the field :

1264. Obverse. An irradiated Geneva Cross. Upon it, branches of laurel tied by ribbon. Within, 1870 | 1871.

Reverse. Within a circle, the emperor's initial W beneath a crown ; beneath this : Für Pflichttreue | im Kriege Inscription : Gott war mit uns Ihm sei die Ehre. Exergue : a star. Berlin iron. 12.

I owe its description to Dr. Mundé, who was good enough to send me the medal for the purpose.

1265. Obverse. The Geneva Cross irradiated. Upon it, oak branches tied by ribbon. Within, 1870 | 1871.

Reverse. Within a circle, the imperial W beneath a crown; beneath this: Dem Siegreichen | Heere Inscription: Gott war mit uns Ihm sei die Ehre. Exergue: a star. Brass. 12.

This was for service during the war. It was also kindly loaned me for examination by Dr. Mundé.

Assistant Surgeon and Captain James Y. Porter, U. S. A., at present Health Officer of Florida.

1266. A medal from the citizens of Jacksonville, for services during the recent yellow-fever epidemic.

I have learned of this from Surgeon-General Hamilton, but too late to obtain a description for the present paper.

Dr. Edwin Powell (1837–), of Chicago, Ill.

1267. Gold medal for service during Rebellion.

Dr. Charles A. Rahter (1839–), of Harrisburg, Pa.

1268. German war medal. 1873.

Dr. Francis Huntington Rankin (1845–), of Newport, R. I.

1269. Obverse. An irradiated Geneva Cross. Upon it an oak wreath. Within, 1870 | 1871.

Reverse. Within a circle, the imperial cipher W beneath a crown. Below, Für Pflichttreue im Kriege Inscription: Gott War Mit Uns Ihm Sei Die Ehre Bronze. 19 (larger than the similar medal of Dr. Mundé).

Dr. J. M. Rice, U. S. V.

1270. Obverse. Head of Washington, to left.

Reverse. Inscription: Made from a copper bolt taken from the wreck of the Frigate Congress by Surg. J. M. Rice, 25th Mass. Vols. 1864. Copper. 18.

The dies by J. A. Bolen, of Springfield, Mass. Very rare. But two said to have been struck.

Dr. Edward Berrien Turnipseed (1829–), of Richland, S. C.

1269. Sevastopol and other Russian medals for military service. 1854.

In this connection there should also be mentioned

Surgeon Christopher A. Babcock (—1794), Continental Army.

Obverse. Masonic Emblems.

Reverse. Inscription : This medal is presented by Union Lodge, Danbury (Ct.), to William A. Babcock, (infant) son of their much esteemed Brother, Christopher A. Babcock, deceased, 1794. (Engraved.)

Marvin, *American Journal of Numismatics*, April, 1876, p. 73, no. II., obv. figured.

Mr. Edward Harrison May (1824–87), a captain of the American Ambulance Corps during the Franco-Prussian War.

1273. Medal from the French Government.

Other American medals relating to the hygiene of armies and navies, and the merchant marine, will be next described.

(*To be continued.*)

DEPARTMENT OF HYGIENE AT THE UNIVERSITY OF PENNSYLVANIA.—A very important announcement was made November 11th, in regard to the University of Pennsylvania —namely, that Dr. John S. Billings has, with the approval of the Secretary of War and of the Surgeon-General, accepted the position of Medical Director of the University Hospital, to which he was recently elected, and that the duties of this new position will be so arranged as not to interfere with his duties as Medical Director of the Army at the Surgeon-General's office.

It is also announced that the University of Pennsylvania is soon to have a new laboratory of hygiene to cost about $200,000 ; and that $100,000 have been already collected for this purpose. The Department of Hygiene has been under the supervision of Dr. Samuel G. Dixon since the death of Dr. N. A. Randolph.

It was rumored at first that Dr. Billings was to supersede Dr. Dixon, but the Provost of the University promptly denied this rumor, and stated that Dr. Dixon was still Professor of Hygiene in the University and in charge of the Laboratory of Hygiene, which has been equipped through his exertions and liberality.—*Medical and Surgical Reporter.*

EDITOR'S TABLE.

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SCANDAL ON THE HOG.

The Ohio State Sanitary Association held its seventh and, as appears, last annual meeting at Columbus, November 21st and 22d, 1889, concluding its work by the adoption of a resolution disbanding the organization. It has done much excellent work, and to its influence is chiefly due the creation of the Ohio State Board of Health.

Among the papers read, and that which seems to have attracted the most attention, was the annual address of the President, Dr. D. H. Beckwith (President of the State Board of Health), on "*The Hog.*"

He took up the history of this useful animal from the time of its first introduction into the country, by Columbus, in his second voyage, by way of Haiti, in 1493, whence it subsequently made its way to Florida with De Soto, about the year 1538. "Those hogs," however, Dr. Beckwith said, "differed widely from the hog of to-day. They were coarse, large-boned, and deficient in fattening qualities, ranging from the attenuated razor-backed, forest-roaming denizen of the South, with features sharp enough to drink buttermilk from a jug: to the plump, rosy-skinned, sumptuous-faring domestic pet of the North, with a double chin and laughing face of the contented epicure."

He proceeds to do the hog great injustice; alleges that "no animal has such filthy habits;" that those "habits are natural, not acquired, and that no amount of careful breeding will ever modify them," which is utterly at variance with the natural history of the hog, everywhere except from necessity; and about as reasonable as it would be to accuse mankind of natural cannibalism, because forsooth, like the hogs raised in the precincts of American cities, they must eat garbage and offal or starve.

Surely Dr. Beckwith has never studied the hog in his wild state or hunted the woods for the sow in pig-bed, or he would have discovered the well-made and cleanly bed of the motherly sow, who is far more careful in preserving its cleanliness than is the cultivator of the laughing beauty which he admires. Moreover, the "coarse, large-boned, razor-backed, forest-roaming denizen of the South" was and *is*—for he still lives in numerous descendants—chiefly due to his *cleanly* habits and abundance of sound and healthful food. His range is the wild woods, where he feeds upon nuts and such sweet roots as he is fond of for about three quarters of his life, and for the other quarter he has the gleanings of the harvest fields of oats, wheat, Indian corn, and sweet potatoes, and a final clean bed of pine shatters, and is stall-fed from six to eight weeks chiefly with an abundance of clean vegetable food and fruit, when he is slaughtered. Is it any wonder that the bacon and hams of such hogs are proverbial for their excellence and freedom from trichina?

But Dr. Beckwith is by no means alone in his estimate of the hog. It is by the same standard, doubtless, that some municipal governments, even with the approval of the health authorities, practically promote the cultivation of poisonous meat by collecting and selling garbage for the special purpose of hog food; and there are, unfortunately, many hog raisers in America so superhoggish in their greed for gain that they stand not upon the order of it.

Garbage is prone to speedy putrefaction. This process is due to various species of living bacteria; and, moreover, garbage in such a state is well known to be infested with the germs of trichina and other parasites which mature in the animal body.

The length of time trichina will remain alive in the meat of the hog infested with them is indefinite; they are not destroyable by salt, drying, or smoking—by anything, apparently, except heat. The *thorough cooking* of hog meat of every variety is the only safeguard against trichina, so long as the feeding of hogs on garbage or other impure food is tolerated.

SAUSAGES have long been known to be sometimes poisonous, even when there has been no cause to suspect the soundness

of the meat which serves the basis of their composition. As generally understood hitherto, sausages consist of two kinds: those made from fresh meat and Bologna sausages from dried meat.

The former are the kind with which American people are most familiar. These consist of finely-chopped fresh *pork*, bread, and condiments; and as they are moist they cannot without smoking or other special care be kept long without spoiling. Their value and flavor depend upon the quality and quantity of meat and the proportions of the condiments used in their composition; and when made with due care and well cooked, they are agreeable and wholesome food. But they are so liable to be made of inferior or even diseased meat of any kind, disguised by an excessive use of pepper and other hot condiments, that the uncertainty of the true composition of those on the market is proverbial; and, in view of recent developments, not without danger to those who consume them.

Bologna sausages of the best kind are composed of *bacon* and *pea flour*, chiefly flavored with garlic and cloves. And when the bacon is *old*, but sound, such sausages are both highly nutritious and wholesome, and possessed of excellent keeping qualities, well adapted to their most extensive use by laborers, travellers, soldiers in camp, and others who have not the means of cooking at hand. They rarely spoil, but being partaken of without cooking, there is some danger of trichina —the more if the hogs from which the bacon was made were fed on garbage and the bacon was not well cured before it was used.

Horse flesh is a recent innovation in sausage manufacture, and the more regrettable by reason of its practice, if not, indeed, its origin in this vicinity; though it is said to be also extensively practised in Italy recently, as well as by Italians hereabouts, and that a large business is done at Newcastle-on-Tyne in shipping old and diseased horses to Antwerp for the same purpose.

The Brooklyn precinct of Newtown Creek and its flats has long been so notoriously foul by reason of the emanations from sewage, factory waste, manure soakage, and whilom rendering establishments thereabouts, of which the creek and flats have been the receptacle, as, seemingly, to render it particularly auspicious as a site for this new industry.

The meat used for the purpose is, confessedly, of worn-out horses by disease or otherwise—"fit for nothing else"—on the border-line of the rendering factory. The sausages made from the meat of such animals are said to be of the Bologna variety in appearance, and their justification is based upon the wholesomeness of horse flesh when *healthy*. How long it will be ere they add a new variety to or greatly aggravate the prevalence of the diseases caused by impure food depends upon the tolerance of the traffic by the health authorities.

BACILLUS INFLUENZA?—January 22d, the New York *Herald* (which, by the way, appears to be taking the lead in proclaiming the results of scientific researches no less than other news) announced: "Professor Weichselbaum, of the University of Vienna, has discovered the bacillus of influenza. He finds in it some similarity to the pneumonia bacillus, but is sure that it is a distinctly different microbe." And on the next day, January 23d, the *Herald* devotes nearly three columns to the subject, including a claim of priority of discovery, "about the middle of December," with description of the bacillus by Drs. Maximilian and Adolph Jolles, of the Bacterian Laboratory of the general hospital of Vienna. "They resemble in no way the cholera microbe," the Drs. Jolles say, "but have many points of resemblance with the bacilli of pneumonia discovered by Dr. Friedlander. . . . Deep down in the gelatine they look like round, sharply defined, yellowish, minutely granulated organisms. When seen on the surface of the gelatine they present the appearance of infinitesimally small porcelain buttons. Now for comparison with the Friedlander cocci, which they resemble generally, but not when prepared as tube cultures, they showed the characteristic nail shape, but placed alongside the Friedlander cocci the influenza bacilli appeared less brilliant, more bent and crooked. Subjected to the aniline color tests, the influenza bacilli go through it very much like the Friedlander bacilli. By means of watery aniline colors we produced a fine preparation of slides."

But to this, Dr. Germain Sée, of Paris, says the Drs. Weichselbaum and Jolles have discovered no new germ at all, that, "there is no such a thing as an influenza microbe. The microbe they are making a fuss about is simply the pneumonia

microbe developed to an extraordinary extent by influenza. What caused the great number of deaths in the recent epidemic? Not influenza but pneumonia, which seemed to grow out of influenza. 'La grippe,' while it has no microbe of its own, has a singular and unexplained property of preparing the way for a splendid crop of pneumonia microbes.

"I discovered the pneumonia microbe myself, or rather it was discovered by my *chef de laboratoire*, Dr. Talamon. This was as far back as November 30th, 1883, when the results of our experiments were communicated to the Anatomical Society of Paris. It is true that Dr. Friedlander made a similar communication to the Berlin Medical Society on November 19th, 1883, a few days before our announcement; but Friedlander's supposed pneumonia microbe has since proved to be the microbe of something else; in fact, it has almost disappeared, while ours is admitted by the scientific world to be the real, unmistakable bacillus of pneumonia."

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—*Mobile*, 40,000: Reports 63 deaths during December, of which 23 were under five years of age. Annual death-rate, 18.9 per 1000. From zymotic diseases, 6, and from consumption, 11.

CALIFORNIA.—For the month of December, 1889, the Secretary's abstract of the reports received from 94 cities and towns, with an aggregate population of 781,900, the number of deaths was 963. Annual death-rate, 14.76. Deaths from consumption during the month, 171. From zymotic diseases: Diphtheria and croup, 35; typhoid-fever, 44; typho-malarial-fever, 2; cerebro-spinal-fever, 17; diarrhœal diseases, 20; whooping-cough, 2; scarlatina, 1.

CONNECTICUT.—For the month of December, 168 towns, with an aggregate population of 759,022, report 948 deaths, 186 being under five years of age. Annual death-rate, 15.0

per 1000. Deaths from zymotic diseases numbered 157, and from consumption, 125.

DISTRICT OF COLUMBIA.—Total deaths during four weeks ending December 28th, 384, of which 113 were under five years of age. There were 187 deaths in the colored population. Annual death-rate, 19.9. Zymotic diseases caused 69 deaths, and consumption, 71.

LOUISIANA.—*New Orleans*, 254,000 : During the four weeks ending December 28th there were 473 deaths, of which 112 were under five years of age. There were 168 deaths in the colored population. Annual death-rate per 1000, 24.29. From zymotic diseases there were 58 deaths, and from consumption, 59.

MARYLAND.—*Baltimore*, 500,343 : During the four weeks ending December 28th, there were 694 deaths, of which 243 were under five years of age. Annual death-rate, 18.04 per 1000. There were 116 deaths from zymotic diseases, and 97 from consumption.

MASSACHUSETTS.—*Boston*, 420,000 : Reports for December 919 deaths, of which number 238 were under five years of age. Annual death-rate, 26.25 per 1000. From zymotic diseases there were 123 deaths, and from consumption, 145.

MICHIGAN.—For the month of December, 1889, compared with the preceding month, the reports indicate that pneumonia, inflammation of kidney, measles, whooping-cough, inflammation of brain, and small-pox increased, and that remittent-fever, scarlet-fever, typhoid-fever, typho-malarial-fever, dysentery, and puerperal-fever decreased in prevalence.

Compared with the average for the month of December in the three years 1886–88, inflammation of kidney, measles, whooping-cough, inflammation of brain, and small-pox were more prevalent, and remittent-fever, typho-malarial-fever, dysentery, membranous croup, cerebro-spinal meningitis, cholera morbus, and cholera infantum were less prevalent in December, 1889.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of December, 1889, at 57 places, scarlet-fever at 64 places, typhoid-fever at 57 places, measles at 22 places, and small-pox at 2 places.

Reports from all sources show diphtheria reported at 12 places less, scarlet-fever at 7 places less, typhoid-fever at 26 places less, and measles at 4 places more in the month of December, 1889, than in the preceding month.

Detroit, 250,000 : Reports for the month of December 279 deaths, of which 66 were under five years of age. Annual death-rate, 13.14 per 1000. From zymotic diseases there were 78 deaths ; from consumption, 22.

MINNESOTA.—*St. Paul*, 180,000 : Reports for December 135 deaths, of which 69 were under five years of age. Annual death-rate, 7.50 per 1000. From zymotic diseases, 39, and from consumption, 8.

MISSOURI.—*St. Louis*, 450,000 : Reports for December 622 deaths, of which number 196 were under five years of age. Annual rate of mortality, 16.58 per 1000. From zymotic diseases there were 125 deaths, and from consumption, 60.

NEW HAMPSHIRE. —The following contagious and infectious diseases were reported to the State Board of Health for the month of November :

Diphtheria : Keene, 27 ; Claremont, 3 ; Rochester, 1 ; Manchester, 7 ; Boscawen, 1 ; Newport, 5 ; Concord, 1 ; Barrington, 2 ; Nottingham, 1 ; Epping, 4 ; Wolfeborough, 1. The Wolfeborough Board of Health reports, " Immediately isolated the family, and restrictive measures, promptly enforced, stamped out the disease."

Scarlet-fever : Claremont, 3 ; Salem, 2 ; Keene, 1 ; Manchester, 17 ; Bedford, 1 ; Goffstown, 2 ; Tilton, 3.

Typhoid-fever : Claremont, 3 ; Rochester, 1 ; Manchester, 6 ; Boscawen, 1 ; Rindge, 1 ; Nashua, 1 ; Newport, 4 ; Goffstown, 1 ; Exeter, 3.

Measles : Manchester, 9.

Croup : Concord, 2.

NEW JERSEY.—*Paterson*, 85,000 : Reports 135 deaths during December, of which number 42 were under five years of age. Annual death-rate, 18.7 per 1000. There were 12 deaths from zymotic disease, and 23 from consumption.

NEW YORK.—The total reported mortality for December is about 1000 in excess of that of November, but is not much higher than that of December, 1888. In 130 cities, villages, and large towns having an aggregate population of 4,018,000 there were 7160 deaths, representing an annual death-rate per 1000 of 21.38. In the rate of infant mortality there is little variation from last month. The proportion of deaths from zymotic diseases is less than it was in November, but this is due to the preponderance of deaths from other causes, as the actual zymotic mortality varies very little from that of last month. From respiratory diseases there is an increased mortality over last month and over December, 1888. This is probably due in part to the appearance generally throughout the State at the commencement of the last week of the month of epidemic influenza, from which cause directly a few deaths are returned. The number of deaths is increased for nervous diseases. Consumption causes an unusual proportion of deaths, 133.33 per 1000 total mortality.

During the year 1889 : "There have been 104,233 deaths reported in the *Monthly Bulletin ;* besides these about 3000 death returns have been received too late for insertion ; in all, 107,233. Of these 77,990 came from 28 cities having an aggregate population of 3,442,000, the death-rate per 1000 being 22.66. At the estimated population for the State (disregarding about 80,000 of the population making no return whatever of vital statistics) of 5,750,000, the death-rate of the State is 18.65 per 1000 annually ; that of the portion of the State outside the cities is 13.00 per 1000—the returns, however, being incomplete.

"The zymotic death-rate for the cities is 4.96 per 1000 population ; for the entire State, 3.89. The prevalence of smallpox, which began in 1887 and continued through 1888, came to an end in June, a few cases from a fresh source occurring later at Albany and Binghamton ; for several months there has been freedom from it in the State. Diphtheria has for two

years shown a lowered death-rate—1.03 per 1000 population for 1889. Scarlet-fever has prevailed to the same degree as in 1888. Whooping-cough caused 0.23 deaths per 1000 population—nearly as many as typhoid-fever, having been more prevalent than for years. Measles has also been unusually prevalent. Typhoid-fever has been somewhat more prevalent, having a death-rate of 0.27 per 1000 population. Other zymotic diseases caused fewer deaths than last year. From consumption there were 2.78 per 1000 population in the cities and 1.20 per 1000 for the rest of the State. From acute respiratory diseases there were 2.36 deaths per 1000 population in the entire State, being the same as in 1888. There were more deaths, proportionately, than last year from urinary and circulatory diseases and fewer deaths from old age."

New York, 1,571,558 : Total deaths, 3319—1006 under five years. Annual death-rate, 24.86. From zymotic diseases there were 357 deaths, and from consumption, 520.

An analysis of the vital statistics of tenement-houses in the section of the city west of Broadway and south of Fourteenth Street, recently submitted, shows the highest death-rate on the records. The purpose of the report is to show the advantage of having tenements on single lots and doing away with rear houses, and also of having the Health Department supervise the construction of all buildings.

"In regard to the death-rate on lots containing front and rear houses," the Registrar remarks, "it was found that the general rate was 25.05, against 22.42 on lots containing single houses. These estimates are based on an average population of from forty to fifty in each house. The rate for children under five years of age was greater in the single lot houses, being 96.55 against 87.14.

"Singularly enough, the highest death-rate for children is in the wards where they form the smallest percentage of the population—probably due to a greater prevalence of contagious diseases in these wards, especially diphtheria."

Brooklyn, 821,525 : Total deaths, 1580—504 under five years. Annual death-rate, 22.64. From zymotic diseases there were 239 deaths, and from consumption, 186.

During the year 1889 the number of deaths reported was 18,480, being 419 more than during the previous year. The

death-rate was 22.17 per 1000 of population. The four chief causes of death were : Phthisis, 2055 ; pneumonia, 1814 ; diarrhœal diseases, 1449 ; diphtheria, 1101.

The birth returns for the year 1889 numbered 17,075, and the marriages, 9606.

Buffalo, 230,000 : Total deaths (four weeks ending December 28th), 302—101 under five years. Annual death-rate, 17.07. From zymotic diseases there were 47 deaths, and from consumption, 31.

Rochester, 130,000 : Total deaths, 164—46 under five years. Annual death-rate, 15.33. From zymotic diseases there were 16 deaths, and from consumption, 24.

Albany, 103,000 : Total deaths, 199—65 under five years. Annual death-rate, 23.18. From zymotic diseases there were 33 deaths, and from consumption, 30.

Syracuse, 80,000 : Total deaths, 93—29 under five years. Annual death-rate, 11.16. From zymotic diseases there were 12 deaths, and from consumption, 12.

OHIO.—*Cincinnati*, 325,000 : Reports for December 482 deaths, of which 164 were under five years of age. Annual death-rate, 17.79 per 1000. From zymotic diseases there were 85 deaths, and from consumption, 60.

PENNSYLVANIA.—*Philadelphia*, 1,040,245 : Reports for four weeks ending December 28th, 1488 deaths, of which 483 were under five years of age. Annual death-rate, 21.12 per 1000. From the principal zymotic diseases there were 169 deaths, and from consumption, 195.

Pittsburg, 230,000 : Reports for five weeks ending December 28th, 316 deaths, of which 178 were under five years of age. Annual death-rate, 17.8 per 1000. There were 46 deaths from zymotic diseases, and 22 from consumption.

RHODE ISLAND.—During the month of December, according to the returns, pneumonia and bronchitis increased about fifty per cent, and typhoid-fever and malarial diseases decreased about fifty per cent from the previous month.

Compared with the corresponding month of 1888, pneumonia, bronchitis, and malarial diseases had an equal prevalence,

while typhoid-fever was largely more prevalent during that month, especially in Providence City.

Other acute diseases had diminished during December except diphtheria and croup, which prevailed to about the same amount, although prevailing rather more largely in Woonsocket in connection with scarlatina.

Measles were epidemic in Glocester, Pawtucket, and Warwick, in rather mild form.

Whooping-cough was quite prevalent in Pawtucket, Woonsocket, and Western Warwick.

Providence, 127,000: Reports for December 208 deaths, of which number 51 were under five years of age. Annual death-rate, 19.65. From zymotic diseases there were 28 deaths, and from consumption, 28.

TENNESSEE.—The principal diseases, named in the order of their greater prevalence, in the State during December were: Pneumonia, malarial fevers, catarrhs, consumption, bronchitis, tonsillitis, rheumatism, catarrhal-fever.

Typhoid-fever is reported in the counties of Bradley, Davidson, Franklin, Grundy, Hawkins, Hickman, Humphreys, Knox, Lincoln, Overton, Polk, Robertson, Rutherford, Shelby, Smith, and Sullivan. Influenza in Gibson, Hancock, Hawkins, Marshall, Maury, Montgomery, Moore, Rutherford, Shelby, Sullivan, and Sumner. Mumps in Haywood, Lawrence, Robertson, Stewart, and Wayne. Measles in Blount, Hamilton, McNairy, and Robertson. Diphtheria in Hamilton, Robertson, and Shelby. Scarlet-fever in Marshall, Shelby, and Sullivan. Whooping-cough in Davidson, Knox, and Robertson. Erysipelas in Cocke, and varicella in Sullivan.

Chattanooga,	white,	9.77 ;	colored,	28.61 :	15.99
Clarksville,	"	4.00 ;	"	24.00 :	9.00
Knoxville,	"	11.41 ;	"	24.34 :	14.06
Nashville,	"	13.95 ;	"	15.01 :	14.35
Memphis,	"	18.26 ;	"	17.56 :	17.94

WISCONSIN.—*Milwaukee*, 210,000: Reports 264 deaths in December, of which 68 were under five years of age. Annual death-rate, 15.1 per 1000. From zymotic diseases there were 53 deaths, and from consumption, 29.

CHOLERA IN MESOPOTAMIA.—*La Journal d'Hygiène* reports *via* Constantinople, on December 5th last :

" Cholera, which broke out suddenly at Chatra and Bassorah in the month of July last, and which since that date has extended gradually over all the territory watered by the Tigris and the Euphrates, as far as Mossoul, seems to be as suddenly checked in that city. Is it the effect of season or of the cold ; of the snow or of the difficulty of intercommunication ? Can we attribute the result to the quarantine, to the sanitary cordons, to the vigilance at the military posts, or to the prophylactic measures which are as easily ordered to be adopted as their practical enforcement is easily evaded ?

" In view of the fact that Europe is seriously threatened shows to my mind a degree of indifference to the danger that we may have to deplore later.

" The following statement will give the present condition in Mesopotamia : Telegrams from Mossoul, Souleimanieh, Rajet, Bedra, and Diarbekir, up to December 6th, 8th, and 10th, inform us that the sanitary condition of these places was satisfactory. The last cases of cholera were registered at Bassorah, on November 24th, and one case occurred at Mossoul, on December 1st."

To this letter of Dr. Gabuzzi the *Journal d'Hygiène* adds :

" The Inspector-General of the Sanitary Service of Turkey came to Paris with the intention of studying and of reporting the best systems of disinfection in use in the lazarettos of France and Italy. In a previous number of the *Journal*, speaking of this mission, the version given of the visit was from the officious—*officieux*—statements of persons connected with the sanitary inspection of France, without, however, attaching much importance to it. This mission should have been undertaken in July last." T. P. C.

CHOLERA IN KHORASSAN.—By New York *Herald* cable *viâ* St. Petersburg, January 27th, 1890, advices from Astrabad report that Persian Khorassan is ravaged by an intestinal disease of excessive fatality. Three thousand deaths are reported. At Noor, in Meshed, there were 100 deaths daily. Owing to the scarcity of doctors, the nature of the disease is unknown. As Western Persia was ravaged with cholera through the au-

tumn, and as thousands of people fled to the eastward in the hope to escape from the disease, it is regarded as possible that they carried it with them, and that this may account for the trouble in Khorassan.

DELIRIUM TREMENS.—The *Cronica Medico-Quirurgica* reports that, in England, during the year 1888, there were 1356 deaths from delirium tremens.

DEATHS FROM MEASLES.—In the cities of Lote and Coronet (Chili), an epidemic of measles has prevailed, from which 600 children died previous to the end of November last.

THE VIRGINIA MEDICAL EXAMINING BOARD at its September meeting received twenty-six applications for examination, of whom sixteen were rejected, two withdrew, and eight only were given permits to practise medicine in the State. Evidently the low-grade medical schools should advise their graduates not to appear before the Virginia Board.

TRI-STATE SANITARY ASSOCIATION.—Arrangements have been completed to hold a Tri-State Sanitary Convention at Wheeling, W. Va., February 27th and 28th, 1890.

Representatives will be present with papers and addresses from Pennsylvania, West Virginia, and Ohio.

The object of the convention is to consider the question of floods and their results from a sanitary standpoint, and the best methods of managing the sanitary interests of a given community after such a calamity.

Every person interested directly or indirectly in this important subject is earnestly requested to be present and assist in discussing the papers and add whatever information he can to the solution of these practical and most important questions, affecting as they do the health and lives of thousands of citizens of these three great commonwealths annually.

GEORGE J. GARRISON, *Secretary.*

WHEELING, W. VA.

MEDICAL EXCERPT.

ECZEMA ACCOMPANYING DENTITION is generally of reflex origin and causes the little patient great suffering. The following suggestions have been made by Besnier :

" The gums are irritable, saliva sometimes very abundant, great disturbance of the nervous system, and sleeplessness ; the face sometimes covered with a thick crust like a mask, leaving only the natural cavities, as nose and mouth, untouched ; in other cases the backs of the hands are deeply incrusted. These conditions indicate three courses of treatment : (1) to quiet the irritation of the gums ; (2) to relieve the insomnia ; and (3) to remedy the external trouble.

" To meet the first indication the gums may be rubbed every hour with the finger, which has been immersed in the following preparation :

" Hydrochlorate of cocaine, 0.05 ctgr. ; bromide of potassium, 0.50 ctgr. ; distilled water and glycerine, each 10.00 gram.

" To cause sleep and remove the nervous irritability a teaspoonful of the following mixture may be given every hour until four doses have been given :

" Bromide of sodium, 0.30 to 0.50 ctgr. (according to age and condition of the patient) ; syr. of orange flowers, 60.00 gram.

" To relieve the facial trouble the following ointment may be applied :

" Ungt. zinc ox., 10.00 gram., vaseline, 30.00 gram."—*Spitalul Bucuresci.*

The translator has found marked benefit from the addition of xx. to xxx. minims diluted hydrocyanic acid and 4.00 gram. of sulphur, to relieve the itching. T. P. C.

THE DESTINY OF PATHOGENIC MICRO-ORGANISMS IN THE CADAVER have been studied by the well-known bacteriologist, Dr. E. Esmarch, who has published a series of experiments made while investigating the changes or evolutions of the pathogenic micro-organisms in the human body after death.

From these experiments it appears that shortly after death there is an increase in the number of these microbes, but that

somewhat later they all die, and the more rapidly the process of putrefaction advances the sooner their destruction occurs.

The destruction of these bacilli may be explained by the development of a species more vigorous, which destroys the pathogenic species, partly mechanically, by their enormous numbers, and partly by the chemical changes which take place in the matter in which they were developed, giving rise to substances which cause the destruction not only of the pathogenic species, but also of the destroying species in the later periods of the putrefactive decay. The author concludes from these experiments that the burial of the bodies of animals that have died from infectious diseases does not favor the development of epidemics.—*Zeitschrift für Hygiene.* *T. P. C.*

CATHETERIZATION OF THE BRONCHIAL TUBES.—Dr. Landgraf has recently presented to the Medical Society of Berlin a case of spasmodic contraction of the trachea cured by catheterizing the bronchial tubes. The symptoms of the disease, as he reported them, were: Dyspnœa, particularly on inspiration; respiration relatively prolonged; the absence of interval between inspiration and expiration; a peculiar sound accompanying it (*du cornage*); stopping of the movements of the larynx during respiration.

The patient takes rest while leaning forward; the voice is changed; there is no respiratory murmur, and the thoracic vibrations are diminished while the percussion sounds are full and resonant; of course these symptoms are unilateral when treating of broncho-stenosis.

The irritability of the larynx and trachea having been removed by cocaine, the catheter was introduced; the instrument penetrated to the depth of thirty-nine centimetres in the right bronchus and thirty-five in the left without meeting any obstruction; neither blood nor pus was evacuated, the patient bringing up only a small quantity of mucus. He obtained immediate relief, and progressed favorably, so that on March 31st—the sound had been introduced three times—he left for home cured. At the time of his departure he complained only of a little pain in the right side of the larynx."

The *Gazette Hebdomadaire*, from which this report is taken, remarks that there are contractions from compression and

others from alterations of the walls. Such cases are quite well known. It is the spasmodic contraction here mentioned, that has not been reported heretofore. T. P. C.

FEES FOR MEDICO-LEGAL KNOWLEDGE?—The following statement from the *Gazette Hebdomadaire* will interest those who may be engaged in medico-legal questions :

" The Senate has taken for consideration the case of the physicians of Rodez (France), who have all refused to obey a requisition of the Court to perform an autopsy on a corpse in which a medico-legal question was involved. M. Lacombe very ably presented the grievances of the medical profession who have for years protested without redress against the contemptible fees allowed them in such cases. The fees paid to men who kill useless horses (*equarrisseurs*) are much greater than those allowed to the expert, to whom is confided a duty in the performance of which he must be in every respect a loser.

" The Ministre de la Justice could not fail to recognize the justice of the protest made by the medical profession. A committee has been appointed to inquire into the matter. The interpellation in the Senate will probably stimulate that body to take some decisive step. If the medical profession were properly compensated the law might be modified and the physician be obliged in every case to obey the requisition of the Court.

" M. Cornil has taken advantage of the interpellation of M. Lacombe to ask for the granting of a special certificate or diploma for physicians who have acquired more than ordinary skill in medico legal questions. That is certainly a very important matter, and one that must be solved some day in the interest of justice.

" The granting of diplomas for experts in hygiene and legal medicine will be done in the near future.

" The Senate, without determining the special case of the physicians of Rodez, passed a resolution *ordre du jour*, in which it directs the attention of the Ministre de la Justice to the changes to be made in the tariff of honorariums established in 1814, and to the modifications to be made in Article 475 of the Penal Code." T. P. C.

LITERARY NOTICES.

THE NATIONAL MEDICAL DICTIONARY: INCLUDING ENGLISH, FRENCH, GERMAN, ITALIAN, AND LATIN TECHNICAL TERMS USED IN MEDICINE AND THE COLLATERAL SCIENCES, AND A SERIES OF USEFUL DATA. By JOHN S. BILLINGS, A.M., M.D., LL.D., Edinburgh and Harvard; D.C.L., Oxon.; Member of the National Academy of Sciences; Surgeon U. S. A.; etc., etc. With the collaboration of W. O. Atwater, M.D., Frank Baker, M.D., S. M. Burnett, M.D., W. T. Councilman, M.D., James M. Flint, M.D., J. A. Kidder, M.D., William Lee, M.D., R. Loring, M.D., Washington Matthews, M.D., C. S. Minot, M.D., H. C. Yarrow, M.D. Two volumes, large octavo, pp. 731–99. Philadelphia: Lea Brothers & Co.

This work is just what every student physician who would keep abreast with the progress of medicine and the collateral sciences should expect of the author-in-chief and his collaborators. It is the most complete dictionary of the terms used in medicine and its congeners hitherto published. Dr. Billings is so well known as a recognized authority in the technicalities of medicine and its appurtenances as to well-nigh place his work in this regard above criticism; and his helpers in this particular work are all identified with such co-ordinate fields of labor as to have eminently fitted them for their participation in the extensive research and verification necessary to the completeness of the work.

Prefatorily it is stated that the total number of words and phrases defined is 84,844, of which 25,496 are Latin, 9158 French, 16,708 German, and 6514 Italian. This does not include French, German, and Italian synonyms given only in connection with English or Latin primes.

Prefixed to the first volume, forty pages are devoted to a series of important tables: Doses of Medicines (in both Apothecaries' Weights and Measures and the Metric System); Poisoning and Antidotes; Systems of Numbering Spectacle-

Glasses ; Expectation of Life by Certain Life Tables ; Relation of Girth of Chest to Height of Men ; Dimensions of Parts and Organs of Body ; Weights of Organs of Human Body ; Dimensions of Fœtus—Comparative Scales ; Comparative Scales of Weights and Measures ; Graphic Comparison of Thermometric Scales ; Tables of Foods and Dietaries ; Charts of the Nutritive Ingredients and Refuse and Amounts of Potential Energy in Food Materials ; Standards for Daily Dietaries, and Actual Dietaries of People of Different Classes. These tables are of great practical utility to all physicians.

The publishers' part of the work is co-ordinate with the excellence of its contents. Indeed, this might well go without saying, of the Messrs. Lea Brothers & Co., who have so long been foremost in the excellence of their medical publications. Every part of these volumes bears evidence of their superior skill in this regard. To both authors and publishers the medical profession is laid under lasting obligations for the superior excellence of these volumes.

WOOD'S MEDICAL AND SURGICAL MONOGRAPHS : Numbers 2 and 3 of Vol. III., 1 and 2 of Vol. IV., and 1 of Vol. V., are in keeping with the other numbers of this excellent publication which have been reviewed in these pages. Number 2, for August, 1889, contains :

" The Treatment of Syphilis at the Present Time," by Dr. Maximilian von Zeissel. " The Treatment of Inebricty in the Higher and Educated Classes," by James Stewart, B.A. " Manual of Hypodermic Medication," by Drs. Bourneville and Bricon.

September number (3) : " Congestive Neurasthenia or Nerve Depression," by G. White, M.D. " The Art of Embalming," by Benjamin Ward Richardson, M.D. " The Etiology, Diagnosis, and Treatment of Tuberculosis," by Dr. H. von Ziemssen. " Psychotherapeutics, or Treatment by Hypnotism," by Dr. C. Lloyd Tuckey. " Sexual Activity and the Critical Period of Man and Woman," by Dr. Louis de Séré.

October number (Vol. IV., No. 1) : " The Influence of the Male Element upon the Female Organism," by John Brown, M.D. " The Internal and External Temperature of the Human Body as Modified by Muscle-kneading," by A. Symons

Eccles, M.B. "The Diseases of the Breast," by Thomas Bryant, F.R.C.S.

November number (2): "On the Surgery of the Knee-joint," by C. B. Keetley, F.R.C.S. "Aids to Ophthalmic Medicine and Surgery," by Jonathan Hutchinson, Jr. "Bacteriological Technology for Physicians," by C. J. Salomonsen.

January, 1890, Vol. V.(1): "Neuralgia: Its Etiology, Diagnosis, and Treatment," by W. R. Gowers, M.D., F.R.C.S. "The Prognosis of Diseases of the Heart," by Professor E. Leyden, Berlin. "The Sputum: A Contribution to Clinical Diagnosis and Practical Examination for Tubercle Bacilli," by Peter Kaatzer, M.D. "Hypnotism: Its Significance and Management Briefly Presented," by Dr. August Forel. "The Forms of Nasal Obstruction in Relation to Throat and Ear Diseases," by Greville Macdonald, M.D. $10 a year; $1 a copy. New York: William Wood & Co.

ALDEN'S MANIFOLD CYCLOPÆDIA, Vols. XV. and XVI., Fluctuate—Galvanism; Galvanized Iron—Gog and Magog, pp. 634–632.

These volumes maintain the marvellous cheapness and excellence of a concise library comprising the entire circle of knowledge of both words and things, alike necessary to every reader as a dictionary or a complete collection of essays. The particularly striking articles, in their course, in these volumes, are: "Food, Food and Drink;" "Foot," anatomically and physiologically, with illustrations compared with foot-gear and deformities; "Fortification;" "France;" "Franklin;" "Galvanism;" "Gases;" "Gas Engines;" "Geology;" "Germ Theory;" "Glass." Fifty cents a volume in cloth; sixty-five cents half morocco. Ten cents extra if sent by mail. John B. Alden, Publisher, 393 Pearl Street, New York.

MONOGRAPHS: The Diagnosis and Treatment of Chronic Catarrh; Diarrhœa; Whooping-cough; Diphtheria; Otitis Media Purulenta; Post-Rectal Abscess; Ovarian Cysts; Germicides; Present Status of Antiseptic Surgery, and the Best Methods of Treatment in Various Operative Wounds, are the respective titles of essays by distinguished medical practitioners, comprised in a handsomely-gotten-up and well-illustrated

little volume, showing the extensive use and advantage of Listerine in a great variety of diseased conditions requiring antiseptic treatment. St. Louis : Lambert & Co.

REPORT OF THE COMMISSIONER OF EDUCATION FOR THE YEAR 1887–88. Pp. 1222.

This volume is replete with information on the practical work of the Bureau and the status of education throughout the country, but unfortunately, like the many excellent volumes preceding it, more than a year subsequent to the end of that upon which it reports ; consequently, though new to the reader, lacking in interest by lack of freshness. With regard to this the Commissioner says : " The manuscript of this Annual Report was completed nearly three months sooner than that of the previous year, and was transmitted to the Secretary of the Interior, February 25th, 1889. The Report for 1886–87 was sent to the printer on May 16th, 1888, but was not printed and delivered to the office until January 4th, 1889." Surely such dilatoriousness is not at all calculated to stimulate the action of school officers and teachers to such co-operation and promptitude in making their returns to the chief of the Bureau, without which it is not practicable for him to give a complete summary.

The magnitude of the work of the Bureau is indicated by this paragraph :

" During the year under review 15,197 written letters and 240,000 copies of documents were sent out, besides more than 14,000 statistical inquiry forms, while 11,096 written letters, 12,000 statistical returns, 44,000 acknowledgments, and 6913 documents (books and pamphlets) were received. One copy of each of these publications was sent to the library of the office, and the others distributed to such correspondents as the character of the documents rendered proper.

" In addition to these the office received from the Government Printing Office 172,799 copies of the reports and circulars of information printed for its use."

The library now contains over 21,000 volumes and 80,000 pamphlets, 2000 volumes and 20,000 pamphlets having been added during the preceding year. The Museum has also been enriched by the accession of many articles during the same

period. But many other desirable additions—college catalogues, maps, school apparatus, etc.—which ought to be collected are hindered by the inadequacy of the quarters.

The publications of the office, as summed up by Commissioner Dawson since his accession to office, August, 1886, to the time of submitting this report, August 31st, 1888, comprise a total of 5392 pages—1771 being of matter in progress at the time of his accession to office. And there is about as much more—upward of 5000 pages—in progress at this date (August, 1888).

The Commissioner declares his unqualified adherence to the educational policy rightly known as the American Common School System, and proceeds to display its advantages as revealed by its status in the several States and Territories of the Union.

Tables of populations are given in conjunction with maps illustrating the advantages of density of population for gathering pupils and promoting education, and the disadvantages of sparsity of population in relatively large territories.

More than twelve million children were enrolled in the schools, of whom eight million were in average attendance, and the expenditure for publication in the country during the year amounted to $122,455,000.

Manual Training has been greatly extended, and is deemed to be among the most important of recent improvements in the progress of public education. This is enforced by quotations from the writings of Dr. W. T. Harris (who has succeeded to the office of Commissioner) and others, endorsed by its practical application in many schools.

The statistics of the systems pursued in the several States and Territories and of cities, in so far as they differ from scattered communities, are given in detail, showing the population, registration, and attendance throughout. Statistics of Training Schools, of Normal Schools, Secondary Schools, Colleges for Women, Universities and Colleges, of Colleges of Liberal Arts, Schools of Science, and Professional Education with its requirements in Theology, Law, and Medicine, are full, and of much practical utility to all persons engaged in educational and professional pursuits.

THE SANITARIAN.

MARCH, 1890.

NUMBER 244.

THE BROOKLYN HEALTH EXHIBITION.

HELD UNDER THE AUSPICES OF THE LOCAL COMMITTEE OF ARRANGEMENTS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION (AT ITS SEVENTEENTH ANNUAL SESSION), AT BROOKLYN, N. Y., OCTOBER 22D TO NOVEMBER 30TH, 1889.

THE Special Committee of the Local Committee of Arrangements, appointed November 27th to report on the Health Exhibition, respectfully submit the following report :

At the first meeting of the Local Committee of Arrangements of the American Public Health Association, Dr. A. N. Bell proposed, as one of the features of the meeting of the Association in Brooklyn, on October 22d, an exhibition of sanitary goods and appliances. In advocating this proposition, he presented the annual report of the recent Health Exhibition in connection with the British Association. So successful has that exhibition become that the number of visitors is often upward of 20,000. It was stated that such an exhibition would be a great object-lesson for the people, and as such would tend powerfully to promote the objects of the Association, which were declared in its constitution to be "the advancement of sanitary science and the promotion of organizations and measures for the practical application of public hygiene."

The proposition was unanimously adopted, and a sub-committee appointed, with Dr. A. N. Bell as Chairman and Dr. E. H. Bartley as Secretary. The Committee on Exhibits, thus constituted, prepared and issued a circular containing the following classification of objects of exhibition :

DIVISION I.—THE DWELLING.

Class 1. Dwellings: Models and designs for sanitary dwellings.

Class 2. Treatment of the site: Foundations, drainage, drainage tiles, etc.

Class 3. Materials for construction: Bricks, tiles, floors, cements, etc.

Class 4. Heating: Devices and appliances for furnaces, stoves, water and steam heating apparatus.

Class 5. Ventilation.

Class 6. Lighting.

Class 7. Domestic water supply: Purification, filters, water fittings, etc.

Class 8. Plumbing: Traps, sinks, water-closets, baths, etc.

Class 9. Disposal of waste: Domestic garbage destructors, garbage receptacles, etc.

Class 10. Sanitary furniture: Refrigerators, wall paper (non-arsenical), floor coverings, etc.

DIVISION II.—SCHOOLS AND EDUCATION.

Class 11. Plans and models for improved school buildings.

Class 12. Heating, ventilation, lighting.

Class 13. Furniture and fittings.

Class 14. Improved books, printing, etc.

Class 15. Gymnastic apparatus.

Class 16. Works on sanitary topics.

DIVISION III.—FACTORIES AND WORKSHOPS.

Class 17. Designs and models for improvements in factories and workshops.

Class 18. Life and health-saving devices.

Class 19. Special devices for removing dust and effluvia and preventing injuries from same.

DIVISION IV.—CLOTHING AND DRESS.

Class 20. Improved materials and garments, etc.

DIVISION V.—FOOD.

Class 21. Selected displays of unprepared animal and vegetable substances used as food or in the preparation of food.

Class 22. Prepared vegetable substances used as food, including canned and prepared and preserved fruits and vegetables. Prepared cereals, meals, flour, biscuits, bread, etc. Syrups, sugars, etc.

Class 23. Prepared animal substances used as food : Canned, smoked, salted, preserved and prepared animal foods, including honey.

Class 24. The dairy : Products of the dairy.

Class 25. Beverages of all kinds : Alcoholic, non-alcoholic, tea, coffee, cocoa, chocolate, etc.

Class 26. New varieties of food : Food for infants and invalids.

Class 27. Articles and devices used in the preparation of food : Cooking stoves, ranges, etc. Vessels for preserving food, etc.

Class 28. Adulterants and adulteration.

DIVISION VI.—SANITARY ENGINEERING.

Class 29. Plans for sewerage and sewage disposal.

Class 30. Plans for drainage.

Class 31. Plans for water supply, including purification, filtration, etc.

DIVISION VII.—PUBLIC HEALTH ADMINISTRATION IN CITIES AND TOWNS.

Class 32. Treatment of contagious diseases, including plans for hospitals for same.

Class 33. Vital statistics, blanks, etc.

Class 34. Disposal of waste : Garbage destructors, odorless apparatus.

Class 35. Antiseptics : Disinfectants and disinfection.

Class 36. Reports of local and State boards of health.

DIVISION VIII.—THE LABORATORY.

Class 37. Instruments of precision in meteorology : Thermometers, barometers, hygrometers, etc.

Class 38. General chemical apparatus for health laboratory.

Class 39. Microscopes, etc.

Class 40. Biological apparatus, cultures, etc.

DIVISION IX.—RED CROSS SECTION.

The Commitee secured a hall for the Exhibition after much effort, which answered its purpose fairly well, and at once began the work of canvassing the various branches of business which would furnish suitable goods. The purposes of the Exhibition were everywhere well received, and favorable responses were made to the circular by exhibitors. The Exhibition was thrown open to the public at the time announced, on the opening day of the Association, and the attendance was large throughout the entire period.

No one who visited the Exhibition Hall during visiting hours could doubt the great value to the public of this collection of sanitary goods and appliances. They presented a series of object lessons of infinitely greater value than the most elaborate treatises upon similar topics. It was interesting to witness the eagerness of visitors—men, women, and children —to examine every article, and to notice the satisfaction with which they received explanations. At every stand were skilled men and women, who answered minutely every question of the visitor and explained the methods of practically employing every appliance. In this manner men, women, and even children gained valuable information which will be useful for a lifetime. Hundreds here, for the first time, learned the object and working of a trap in a drain-pipe, and learned it in such manner as to be hereafter sufficiently intelligent in its construction to secure its proper application in their own homes. The same is true of many other articles of house furnishing, domestic utensils, and wearing apparel.

Moreover, during the period of the Exhibition a series of practical lectures on hygiene was given, which were well attended, and, in the opinion of the Committee, enforced many

useful lessons in personal and domestic hygiene and civic cleanliness.

Your Committee can but congratulate the Local Committee of Arrangements on the success of the Exhibition. It has inaugurated a new feature of the meetings of the American Public Health Association, which, if annually repeated in the cities of the United States where the Association shall hereafter hold its sessions, will prove an invaluable means of increasing its usefulness and of popularizing sanitary measures and appliances.

On November 23d, near the close of the Exhibition, the Commitee on Exhibits requested, by resolution, the Chairman and Secretary to prepare a report to the Local Commitee of Arrangements, which should give in detail the work of the Committee.

They reported a few days subsequently as follows :

" With the origin and purpose of this sub-committee, the Local Committee of Arrangements, by whom it was created, is already familiar, as part of its own record :

" ' To arrange for an exhibit of foods, sanitary appliances, etc., at some convenient location, open to the public during the meeting of the Association and as much longer as the Committee may determine.'

" The place selected for the Exhibition was a dernier resort, after failure to find one more easily adaptable to the purpose, within the scope of available means and probable resources for meeting the expenses.

" Your sub-committee at once set about the ascertainment, as far as practicable, of the limits to which the invitation should be confined for a proposed ' exhibition of everything available adapted to the promotion of health.' To this end, with your approval and with the approbation of the Executive Committee of the Association, as expressed by the Secretary in a letter to your Chairman, and, moreover, by the subsequent approval of the President of the Association, personally, to the Chairman of your Committee and the Chairman of this sub-committee, the circular, hereto attached " (before referred to), " defining the limits and terms of the Exhibition was issued.

The last paragraph of the circular, which reads that—

"At the close of the Exhibition the Association will award diplomas to exhibitors of especially meritorious articles, based upon the judgment of experts," was subsequently modified by the Executive Committee of the Association, and at the instance of the said Executive Committee, by resolution of the Committee on Exhibits, to have the same prominently displayed on a card in the Exhibition hall, as follows:

"'*The exhibition of any article does not carry with it the endorsement of the American Public Health Association. At the close of the Exhibition the Association will award testimonials to exhibitors of especially meritorious articles, based upon the judgment of experts.*'

"It was displayed accordingly.

"The Exhibits were as follows:

1. The Engle Fire-Closet, for the destruction of filth and obnoxious substances connected with dwellings, schools, hotels, hospitals, jails, court-houses, public buildings, and manufactories. George H. Warner, 30 State Street, New York.

2. Family Garbage Destructor, for the destruction of all refuse matter from the kitchen of every kind. Charles B. Tefft, M.D., Utica, N. Y.

3. Model of Garbage Burner. Rider, Pittsburg, Pa.

4. Strawberry Hill Pork Products. J. B. Learned, M.D., Florence, Mass.

5. Hungarian Government Wines. Willman-Cossenas Company, Agent, 60 Broad Street, New York.

6. "Sestalit:" Fuel and Stoves. United States Fuel Company, 66 Court Street, Brooklyn, N. Y.

7. Red Cross Society. Brooklyn, N. Y.

8. Contoured Map of the Northern Division of the Passaic River Basin, . . . showing the district proposed to be supplied with water from these sources, etc.; twenty topographical, geological, and geodetic survey maps of New Jersey and publications of the State Board of Health. New Jersey State Board of Health.

9. Brooklyn Health Department Publications. Department of Health, Brooklyn.

10. Typical Tenement-House Plans. New York Health Department.

11. New York State Board of Health Reports. Secretary of the State Board of Health of New York, Albany.

12. Michigan State Board of Health Reports, and other Publications. Secretary of Michigan State Board of Health, Lansing, Mich.

13. Tennessee State Board of Health Reports. Secretary of the State Board of Health, Nashville, Tenn.

14. Massachusetts State Board of Health Reports. Secretary of the State Board of Health, Boston, Mass.

15. United States Marine Hospital Service Reports; Four Charts of Plans for Quarantine Stations and Disinfecting Plants. Surgeon-General United States Marine Hospital Service, Washington, D. C.

16. Charts of Plans for House Drainage. A. L. Webster, C.E., New York.

17. Durham System of House Drainage. Durham House Drainage Company, New York.

18. "Coronet Water-Closet" System. Joseph Guy, New York.

19. Sewage Disposal Works, for Cities, Villages, and Isolated Dwellings. James J. Powers, S.E., Brooklyn, N. Y.

20. "West System" of Filtration and Purification of Water, for Cities and Towns. W. Scott West, New York.

21. "The Missud" Sewer Pipe. J. A. Missud, New Orleans, La.

22. Vitrified Salt-Glazed Sewer Pipe. Rochester Sewer Pipe Company, Rochester, N. Y.

23. "Self-Centring Sewer Pipe." John Cooper, Brooklyn.

24. "American Standard Trap," for Wash-Basins, Baths, Tubs, and Sinks. Sanitary Supply Company, New York.

25. "The Sanitary Closet." Professor E. R. Angell, Derry, N. H.

26. McClellan Anti-Siphon Trap Vent. Dubois Manufacturing Company, New York.

27. The Minnesota Automatic Sewer Flusher. W. D. Van Duser, Minneapolis, Minn.

28. Indurated Fibre Bath-Tub and Boyle's Patent Pneumatic Water-Closets. Henry Huber & Company, New York.

29. Moule's Earth Closet, New Water-Closets, etc. Myer's Sanitary Depot, New York.

30. "Connolly Patent Basin and Hopper Clamps," Trap, Saddle Hubs, etc. The Connolly Manufacturing Company, Brooklyn.

31. "Rustless" Wrought-Iron Steam, Gas, and Water Pipe. The Wells Rustless Iron Company, New York.

32. Wall Papers that Wash and Contain no Arsenic. The American Sanitary Washable Wall Paper Company, Deckertown, N. J.

33. The Neal Improved Infants' Portable Bath-Tub. Miss C. N. Neal, 19 Clinton Place, New York.

34. "Sanitas"—Liquids, Powder, Soaps, Veterinary and Toilet Preparations. The American and Continental Sanitas Company, Limited, New York.

35. Family Ice Machines. L. Dermigny & Company, 126 West Twenty-fifth Street, New York.

36. Self-Acting Brakes against Danger from Railroad Accidents. Thomas Lynch, 152 Park Avenue, Brooklyn.

37. Furnaces and Ranges, Steam and Water Heaters, Ventilating Grates, etc. Richardson & Morgan Company, New York.

38. "New Gas-Tight" (Self-Cleaning) Furnace. The Boynton Furnace Company, New York.

39. "B. S. Benson's Patent Air Purifier." B. S. Benson, 512 East Monument Street, Baltimore.

40. Eye-Glasses and Spectacles. Professor Louis Alexander, 192 Fulton Street, Brooklyn.

41. Carlsbad Mineral Waters and Sprudel Salz and Johann Hoff's Malt Extract. Eisner & Mendelson, New York.

42. Carnrick's Soluble Food, Lacto-Preparata, Phospho-Caffein Compounds, Liquid and Beef Peptonoids, Pancreobilin, Cod Liver Oil and Milk, Toilet and Nursery Soaps and Powder. Reed & Carnrick, New York.

43. Platt's Chlorides. H. B. Platt, New York.

44. The Echo Farm Products. Echo Farm Company, Litchfield, Conn.

45. Metropolitan Fashions. Health Waists, Corsets, etc. Mrs. L. Higham, corner Fulton and St. Felix streets, Brooklyn.

46. The Alfred Dolge Felt Shoes and Slippers. Daniel Green & Company, New York.

47. School Furniture. Rushville School Furniture Company, Rushville, Ind.

48. The Bury Patent Window Ventilator. Theodore Bury, Cleveland, O.

49. Rex Wheat—Cereal Food. The Patent Cereals Company, 45 Pearl Street, New York.

50. Russian Caravan Tea. B. Fischer & Company, 325 Greenwich Street, New York.

51. The Arnold Steam Cooker and Steam Sterilizer. Wilmot, Castle & Company, Rochester, N. Y.

52. The "Aladdin" Cooker and "Aladdin" Oven. Edward Atkinson, LL.D., Boston.

53. Antiseptics and Spit-Cups for Consumptives. Seabury & Johnson, New York.

54. Phenyle Disinfectant. Morris Little & Son, 175 and 177 North Tenth Street, Brooklyn, E. D.

55. Health Lift. Lewis G. Janes, M.D., New York.

56. Bovinine. The Bush Manufacturing Company, 2 Barclay Street, New York.

57. Butterine. Oakdale Manufacturing Company, Providence, R. I. (With regard to this article, after it had been on exhibition for a week, a communication was received from B. F. Van Valkenburgh, Assistant New York State Dairy Commissioner, threatening this sub-committee with prosecution unless it was removed. Fortunately, perhaps, the exhibitor volunteered to and did remove it to avoid any contest over the matter.)

58. Cibils Fluid Beef. The Cibils Company, Boston, Mass.

59. Nestle's Swiss Milk and Milk Food. Thomas Leeming & Company, New York.

60. Murdock's Liquid Food. Murdock Liquid Food Company, Boston.

61. Malted Milk for Infants and Invalids. Malted Milk Company, Racine, Wis.

62. Maltine. Maltine Manufacturing Company, 54 Warren Street, New York.

63. "Fine French Soups, Game Pâtés," etc. The Franco-American Food Company, 101 Warren Street, New York.

64. Hygeia Lithia Water. Hygeia Sparkling Distilled Water Company, New York.

65. Londonderry Lithia Water. Londonderry Lithia Co., New York.

66. Hoff's Malt Extract "Tarrant's." Tarrant & Company, New York.

67. Armour's Pure Foods. Armour & Company, Chicago, Ill.

68. The "Germicide." The Germicide Company, 862 Broadway, New York.

69. Buchan's Horse and Cattle Wash—Carbolic Acid Preparations. Carbolic Soap Company, New York.

70. Rare and Valuable Medicinal Chemicals. E. Merck, New York.

71. Pure Chemicals, Adulterated Drugs, Laboratory Apparatus, Perfumery, Listerine, Sponges, Cork Mats, etc., and the Kodak Camera. McKesson & Robbins, New York.

72. Fall and Winter Underwear for Men, Women, and Children—Pure Wool. Dr. Jaeger's Sanitary Woolen System Company, 827 and 829 Broadway, New York.

73. Dr. Warner's Health Underwear, Manufactured from Camel's-Hair and Natural Wool. Warner Brothers, 359 Broadway, New York.

74. Boots and Shoes made on Hygienic Principles. P. Kahler & Sons, 813 and 815 Broadway, New York.

75. Adjustable Parlor, Library, Reclining and Invalid Chairs. Marks Adjustable Folding Chair Company, New York.

76. Gymnastic Apparatus and Anthropometric Instruments. A. G. Spalding & Brothers, 241 Broadway, New York.

77. Building and Loan News Publications. Building and Loan News Company, 2 Spruce Street, New York.

78. The Backus Open and Reflecting Steam Radiator. The Backus Portable Steam Heater Company, 22 Park Place, New York.

79. Oil Stoves. John S. Williams, Fulton Street, Brooklyn.

80. Miller Fire Extinguisher. Miller Chemical Company, 5 and 7 Dey Street, New York."

"The eighty exhibits, as above enumerated, present but a small proportion of the articles exhibited, as many of the exhibitors display numerous articles.

"An important feature in conjunction with the exhibit has

been a course of Free Lectures at the Brooklyn Institute on sanitary subjects.

"This feature—the lectures—is the only departure by your sub-committee from the scope embraced in the purpose as defined by your Chairman at the outset. It was agreed upon, however, with his approval and assistance, and your sub-committee confidently relies upon your approval."

On the part of the Local Committee of Arrangements, the approval of the proposed exhibition by the Executive Committee of the Association, and its promise "to award testimonials to exhibitors of especially meritorious articles," as hereinbefore shown, was accepted in good faith. The promise was particularly useful to that portion of the Local Committee which constituted the Committee on Exhibits for the encouragement of exhibitors.

The failure of the Association to award testimonials appears to your Special Committee to impose upon the Local Committee of Arrangements the necessity, as far as possible, of fulfilling the terms of the contract, which it had been the means of making, with the exhibitors.

To this end your Special Committee selected several gentlemen familiar with the articles exhibited in the various departments and competent to judge of their merits, and requested each to prepare a report on the department assigned to him, and name such articles as, in his judgment, were of special merit. The following are the reports made and the articles selected:

THE DWELLING AND ITS APPURTENANCES, WATER-SUPPLY, AND THE DISPOSAL OF WASTE.

"*Rustless*" *Wrought-Iron, Steam, Gas, and Water-Pipe.*—Of this there were specimens of various sizes adaptable to the several uses indicated.

The method of rendering iron rustless is, as described, after the article is made to subject it to an intense heat in an air-tight furnace until it has attained an almost white heat, when it is exposed to steam for eight hours, the steam being frequently renewed at short intervals, with the result of forming

magnetic oxide upon the surface. It is then put into an acid well as a finishing process.

The article has been in use for a little over a year, particularly in Pittsburg, Pa., where it is made, and has thus far proved successful. The Wells Rustless Iron Company, 21 Cliff Street, New York.

Highly Vitrified Salt-Glazed Sewer and Drain Pipe, Inverts, Coping, Chimney Tops, and Flue Linings.—This pipe and other articles manufactured and exhibited by the same company have been found to be of excellent quality, tested by extensive use and general satisfaction. Rochester Sewer-Pipe Company. Otis & Gorsline, manufacturers. New York City Office and Yard, One Hundred and Thirty-eighth Street and Third Avenue.

Vitrified Salt-Glazed Sewer and Drain Pipe, of quality apparently equal to that of the Rochester Sewer Pipe Company, and in similar variety. John Cooper, 413 Oakland Avenue, Greenpoint, Brooklyn.

"The Missud" Patent Sewer and Drain Pipe.—This pipe is provided with perforated supplemental tubes extending along the entire length of, and connected with the inner side of, and forming an integral part of the main pipe, each section of which slightly telescopes with a view to securing perfect joints. This device is intended for the injectment of water with such force as to stir up and remove any sedimentitious matter otherwise liable to accumulate and obstruct the needful cleanliness and constant current through the main pipe. J. Alfred Missud, New Orleans, La.

Plan of Powers's Patent Sewage Disposal Works.—The process of these works is precipitation by sendimentation and the admixture of chemicals which combine with the putrescible matter in solution therein ; and, if necessary, further treatment of the effluent by the discharge of chlorine into it, until the desired saturation is reached. The advantages claimed for the process are concentration, purification, economy, and convenience. The sludge can be made innocuous and inoffensive before removal. The process has been in successful operation for many years at Coney Island and several other places cited by the patentee, with such testimony with regard to its efficiency as to leave no question with regard to its adaptability and excel-

lence to and for health resorts and small towns. James J. Powers, Sanitary Engineer, 13 Boerum Place, Brooklyn, N. Y.

The Durham System of House Drainage.—This system comprises a complete structure of wrought-iron pipes with screw joints within, but entirely independent of the building, with water-closet, tub, and basin connections with and entirely supported by the soil-pipe, to which they are secured by set screws with hexagon heads of large diameter, which clamp the flange of the closet or other fixture. The pipes are thoroughly trapped, with needful vent coupling provision, and no water-closet can be used in connection with this system which requires the ordinary trap under it. It is absolutely necessary that the closet be supported on the pipe-fitting. But many of the best makes of closets are adapted to this condition. It originated in Chicago about or nearly ten years ago, where it is extensively used and strongly endorsed by the Pullman Palace Car Company, the Chicago, Burlington and Quincy Railroad Company, and many other corporations. Every building in Pullman is fitted with it, and many of the public buildings and private residences of Chicago. In New York, also, it has made considerable progress, and its excellence is recognized by the Board of Health of the City of New York. The Durham System of House Drainage, New York.

Indurated Fibre Bath-Tub.—The material from which this tub is made is the same as that which has been used for several years for making pails and other household utensils. For this most recent adaptation the fibre is said to be hardened by subjecting it to a high temperature, and thereby made more durable. The outside of the tub in baking is given a rosewood or any other desirable color, or finished in white enamel corresponding with porcelain ; the common inside finish tinted or otherwise. It is represented to be better and cheaper than any other " first-class" tub when finished and set in position, because no expense is incurred for casing or other outside finish. By the same exhibitor,—

Boyle's Patent Pneumatic Water-Closet—the "Crystal."—This closet differs from others in the same class in that it has an additional trap directly under the bowl, especially adapting it to fireproof buildings, where a plumber's trap under the floor cannot be used. Another new feature is the position of

the back air coupling at the side of the bowl near the back, it being reversible to the right or left at convenience. Henry Huber & Company, 81 Beekman Street, New York.

Siphon Water-Closet, known as the "A. G. M.," the traps of which are made in zigzag form, by which the water passing over and through them splashes from side to side, breaks the air which is between the two seals, and starts the siphon, which is effective in scouring the closet. The tank exhibited with this closet was made in one piece of indurated wood fibre. The valve to the tank is double-acting, operated by the seat on closing for use and again the moment pressure is removed. One hundred and seventy-five of them are said to be in use in the "Ponce de Léon" Hotel, at St. Augustine, Fla., and the "Drexel's," of Philadelphia, was recently furnished with them, besides many other places referred to by the proprietor for evidence of their excellence. By the same exhibitor,—

"*Niagara*" *Hoppers*, with flushing rim, made with trap on top of, as also under the floor, as may be desired; *the "Mugwump Closet,"* a short hopper with trap above the floor, enamel finished, and sold for less than ten dollars; and the "*Moule*" *Earth Closet*. Myers Sanitary Depot, 80 Beekman Street, New York.

Joseph Guy's Coronet Water-Closet.—"A water-closet suitable for schools, yards, and public buildings and free from such objectionable features as clogging, freezing, and disagreeable odors." It comprises a system of supply and waste-pipes and a series of closets connected therewith, with the usual appurtenances, traps, and trap-vent connections. Joseph Guy, Plumber, Steam and Gas Fitter, 304 Mott Street, New York.

American Standard Trap for wash-basins, bath-tubs, sinks, etc.—"Requires no ventilation pipes." The special feature relied upon in this trap is a rubber diaphragm, accurately adjusted to a spring valve, which rests firmly upon the waste-pipe, by which the sewer-gas is effectually shut off from contact with the water seal or escape through the basin trap even should it be devoid of water. The flow of water from the basin or sink automatically lifts the diaphragm and valve, and when the water ceases to flow the valve drops quickly upon

its seat and seals the pipe. The Sanitary Supply Company, 152 Broadway, New York.

The Connolly Patent Globe Trap.—This device has been in use for the last seven years, during which time it has become well known to sanitary authorities, architects, builders, and plumbers, and is extensively used and approved by many of the most competent judges. By the same exhibitor,—

The Connolly Patent Basin and Hopper Clamps.—Clamps which are intended to supplant the use of lead or other devices liable to leakage or the accumulation of dirt by the settling of plumbing fixtures. The Connolly Manufacturing Company, 351 and 353 Adams Street, Brooklyn.

The McClellan Auti-Siphon Trap-Vent.—This device consists of a light inverted rustless iron cup with its rim resting in an annular groove of a retaining cup of the same material, containing mercury, into which the rim of the inverted cup sinks and forms an absolute seal against the escape of sewer air. When a slight minus pressure occurs on the sewer side of the cup, the greater external pressure lifts it out of the mercury and permits a free inflow of air until the wanted equilibrium is established, when the cup drops back into the mercury and effectually closes against any outflow. It is claimed that this device accomplishes all the useful purposes sought to be secured by the use of the back-vent pipes and other appliances required by sanitary authorities, and obviates their defects and dangers, and moreover at much less cost. DuBois Manufacturing Company, 245 Ninth Avenue, New York.

"*The Sanitary Closet,*" the exhibitor contends, "stands next to the water-closet for convenience, cleanliness, and health." It consists of a water-closet attachment to a barrel or other vessel, easily detachable, and the vessel being provided with a hinged flap-stopper and bolt, admits of ready removal and disposal of contents at convenience without nuisance. Professor Edmund R. Angell, Derry, N. H.

"*Minnesota Automatic Sewer Flusher.*"—An apparatus designed and adapted to produce a forcible and sudden dash of a large quantity of water through the sewer, thus to remove any accumulation of heavy matter therein contained. It has been effectually used at Minneapolis, and is endorsed by the

health authorities of that city. W. D. Van Duser, Chief of Sewer Department, Minneapolis, Minn.

Filtration and Purification of Water—"*The West Elevated Filter Beds.*"—An elevated structure adapted to the retention of a large mass of sand in separate compartments, so that the inflow of water may be limited to any one or more or alternated from one to the other at will, for the removal of material. It utilizes the best material known for water filtration on a large scale—an abundance of clean sand. W. Scott West, 280 Broadway, New York.

Boynton's "New Gas-Tight" (Self-Cleaning) Furnace.—The radiator is cast in one solid piece, and thus, it is claimed, is positively self-cleaning. The body of the furnace is also cast in one solid piece. The fire-pot being corrugated gives a larger surface to the direct action of the fire, and is consequently claimed to be much more powerful as well as more durable than any other form. By the same exhibitors,—

Hot-Water House-Warming Heater.—This heater is designed to combine the greatest possible amount of positive heating surface with simplicity of construction. It has the advantage, it is claimed, over other water heaters in that the heating surfaces may freely expand, and thus obviate a frequent cause of breakage. It is portable in form, and requires no brickwork for setting. The Boynton Furnace Company, 207 and 209 Water Street, New York.

Improved Combination Heaters—Steam and Hot Water.—This is represented to be an adaptation of the general principles of construction applicable to the old combination boiler, to a more rapid and effective production of steam, by the increase of direct fire surface in the fire-box, and by freer circulation both of water in the boiler and of gases of combustion in the flues ; while the increased flue area greatly improves the draught. The easy cleansing of the boiler by simply brushing, without any interference with the fire, is one of its most commendable features. By the same exhibitors,—

"*Fire on the Hearth,*" a design of an open stove which has been on the market for several years, and is highly approved of by many who have used it. Also by the same exhibitors,—

Richardson's Duplex Range.—"The only double oven range ever manufactured and successfully used to *roast* and *broil* in

a perfectly ventilated oven before an open grate fire." Richardson & Morgan Company, 92 Beekman Street, New York.

"Sestalit," and Portable Parlor, Bed and Bath-Room, and Foot-Stoves for Carriage or Sleigh Use.—"Sestalit is a concentrated vegetable carbon, burns in these stoves without stove-pipe, and in rooms without chimneys," said to emit no smoke or smell. United States Fuel Company, 12 Cortlandt Street, New York.

The "Monitor" Oil Stove.—Said to be "the only oil stove made which cannot explode, since no gas can be generated by it." Variety, suited to heating, cooking, and laundry purposes. Monitor Oil Stove Company, Cleveland, O. Exhibited by John S. Williams, headquarters for oil stoves, 198 Fulton Street, Brooklyn, N. Y.

The "Backus" Patent Portable, Open, Reflecting and Steam Radiating Heater by Oil or Gas Cojoined with Steam.—The special peculiarity in the construction of this heater is the utilization of water to absorb the mephitic emanations from burning gas or oil, and to supply moisture to the otherwise excessively dry air of rooms so heated. The opening or fireplace is occupied by an iron log partially covered with flakes of asbestos, giving it the appearance of burning wood. The arrangement of the gas jets, which are exceedingly small, together with a current of air and evaporation of the water contained in a receptacle at the base, is such as to greatly intensify the heat of the log, promote the complete combustion of the gas, and supply moisture to the apartment. The upper and larger hall, nearly sixty feet square and fourteen feet height of ceiling occupied by the Exhibition, was effectually heated by three of these heaters during the month of November without any noticeable odor or other deleterious effect on the atmosphere. The Backus Portable Steam Heater Company, 22 Park Place, New York.

The Miller Fire Extinguisher, the familiar hand grenade, is highly commended by many who have had occasion to use it. Miller Chemical Company, New York.

B. S. Benson's Patent Air Purifier.—An apparatus designed to filter and purify the air admitted to invalids or others. B. S. Benson, 512 East Monument Street, Baltimore, Md.

Window Ventilator.—A ventilator adjustable to the sill under

the lower sash, with perforations so arranged as to obviate draught. Theodore Bury, 636 Euclid Avenue, Cleveland, O.

Wall Papers that Wash and Contain no Arsenic.—In great variety, and apparently as claimed. The American Sanitary Washable Wall Paper Company, Deckertown, N. J.

Family Garbage Destructor.—For the destruction of all refuse matter from the kitchen. A combination with cooking range or stove without interference with other use, and involving little or no extra labor. So far as experimented with at the Exhibition, it effectually accomplished its purpose. Charles B. Tefft, M.D., Utica, N. Y.

The "Engle Fire-Closet."—For the destruction of filth and obnoxious substances connected with dwellings, schools, hotels, hospitals, jails, court-houses, public buildings, and factories. Constructed in various sizes, suited to different requirements. This cremator has been thoroughly tested under competent observation, and has been found to be an excellent substitute for privy vaults as well as perfect means of destroying garbage of all sorts. George H. Warner, 30 State Street, New York.

Model of Garbage Burner.—Mr. Rider, Pittsburg, Pa.

Plans of House Drainage.—A. L. Webster, Civil and Sanitary Engineer, 3 Broad Street, New York.

Building and Loan News.—A monthly publication devoted to the interests of building and loan associations and all who desire to own their houses. Building and Loan News Company, 2 Spruce Street, New York.

STATE AND MUNICIPAL SANITATION—CLOTHING AND FURNITURE.

The division devoted to State and municipal sanitation included annual reports, either full or partial sets, from the State Boards of Health of New York, New Jersey, Michigan, Tennessee, and Massachusetts ; reports of the Secretary of State Board of Health of Michigan on the Registration of Vital Statistics ; Proceedings of the State Sanitary Convention of Michigan. A fine collection of topographical maps illustrating the geological survey of the State of New Jersey, and showing the levels of surface, mineral resources, boundaries of different

water-sheds, natural drainage of the State, etc., and a complete set of geological reports of the State of New Jersey, accompanied these maps. The annual reports of State Boards of Health placed on exhibition contain, in addition to the usual account of official proceedings, a large amount of information on subjects bearing relation to public health, and, taken together, constitute a most valuable library of sanitary information. Reports of the Supervising Surgeon-General, United States Marine Hospital Service, together with diagrams and plans illustrating the work of that organization present and prospective.

Among the local boards of health submitting reports, working blanks, etc., were those of Nashville, Tenn. ; Newton, Mass., and the cities of Brooklyn and New York. The latter submitted plans showing a typical tenement-house of the past and one of the present time, with improvements in light, ventilation, and drainage.

The Red Cross Section exhibited a cot and stretcher, a number of cuts illustrating the proper method of handling and removing patients, a life-size manikin showing important landmarks as guides in arresting hæmorrhage, etc., an assortment of bandages and compresses of every conceivable form, with other appliances, all going to show the efficiency attained by this philanthropic society in rendering first aid to the injured.

Of the Division Including Clothing and Dress: Warner Brothers, of 359 Broadway, and the Dr. Jaeger's Sanitary Woolen System Company, of 827 Broadway, New York, each exhibited samples of their natural wool and camel's-hair goods, consisting of the various patterns of underwear and other articles of clothing for men, women, and children. The qualities claimed for these goods are softness of texture, lightness of weight, and warmth to the wearer, thus protecting from the severe weather of winter, and by their evaporating qualities regulating the animal temperature during the oppressive heat of summer.

Shoes in considerable variety were exhibited by P. Kahler & Sons, of 815 Broadway, New York, the special claims of which are that the broad sole, the low heel, and the peculiar shape, adapted to the natural form of the foot, have the effect to prevent distortions of the foot or toes, relieve corns or bunions,

if such are already existing, and enable the wearer to walk with natural ease and dignity.

Daniel Green & Company, of 122 East Thirteenth Street, New York, exhibited an assortment of the *Alfred Dolge felt shoes and slippers*, made of the strongest material of the kind, and adapted to both house and outdoor wear. The claims of these shoes are warmth and dryness, as well as ease to tender feet. The assortment placed on exhibition included every variety, from the low-cut house slipper to the high-laced shoe for street use.

Mrs. Higham, of Fulton Street corner of St. Felix, Brooklyn, exhibited articles of ladies wear, including a new "*Health-Waist*," which, while it preserves to the wearer an attractive figure, leaves freedom to the respiratory and voluntary muscles.

Babyhood was represented in articles of infant dress, and copies of the periodical devoted to the interests of the little ones.

"*Infants' Portable Bath-Tub.*"—Miss S. C. Neal, of 19 Clinton Place, New York, exhibited an invention of her own under this name, made of strong rubber cloth folded over a frame of bamboo, cherry, or ebonized wood of camp-chair design. It has a hard rubber faucet at the bottom for water outlet, and at the ends has pockets for soap and sponges and a bracket for towels. When not in use it may be folded like a camp-stool and packed in an ordinary travelling trunk, or by placing a cover over the frame it may be used as a table for the nursery.

The Marks Adjustable Chair Company of 930 Broadway, New York, exhibited an assortment of easy chairs, lounges, etc., so manipulated as to meet every want of the sick or well.

School Furniture.—An assortment of the Rushville school furniture was exhibited by William Schwarzwalder & Company, of 259 Pearl Street, New York.

An attractive Japanese screen was shown by — Morson, of Fulton Street, Brooklyn.

THE DEPARTMENT OF PHYSICAL CULTURE was very fully represented by the exhibit of Messrs. A. G. Spalding Brothers, 241 Broadway, New York. Of their extensive display, the

following articles are mentioned as among the most striking : The mechanical apparatus for the strengthening, development, or co-ordination of almost every muscle in the trunk and extremities was complete, and seemed to be all that could be desired—useful in many cases, and very ingenious ; the machine for the treatment of writer's cramp ; a chair with adjustable spring for the feet and legs, used in extension and flexion ; a compact folding bath—can be used with dry or hot air or steam, with or without medication, and can also be used as a fumigator, the convenience of which will be most appreciated by those who have been obliged to struggle to get a bath in houses where there were no bath-room conveniences.

Anthropometric instruments with the spirometer, convenient and important for all measurements, testing and staying qualities, as well as size ; useful in the examination of candidates for police service and firemen under the civil service regulations.

The bare catalogue of the Messrs. Spalding Brothers' exhibit would occupy over a hundred closely printed pages ; it seemed to comprise every device and apparatus calculated to promote the highest degree of physical culture.

The Health-Lift Machine exhibited by Lewis G. Janes, M.D., 55 Liberty Street, New York, comprised all the advantages of long, practical experience in its construction and adaptation of means most favorable to its successful use.

Eye-Glasses and Spectacles were exhibited in considerable variety by Professor Louis Alexander of 192 Fulton Street, Brooklyn.

Thomas Lynch, of 152 Park Avenue, Brooklyn, exhibited the model of a *Self-acting Brake* against railroad accidents —a somewhat ingenious device, but, so far as we could learn, its efficiency had never been tested.

FOODS AND APPLIANCES FOR THE PREPARATION OF FOOD.

Maltine : Maltine Manufacturing Company, 54 Warren Street, New York. A syrupy preparation of extract of malt, to be used as a digestive tonic or in combination with cod-liver oil and other medicinal substances, as an aid to their

digestion and rendering them more palatable. Manufacture open to inspection of physicians.

French Soups, Game, and Chicken Pâtés : The Franco-American Food Company, 101 Warren Street, New York. These are put up in glass jars and tin cans, and are ready for use on heating. They are extensively used in hotels and in dining-room cars, and are believed to be nutritious and just what is claimed for them. Manufacture open to the inspection of physicians and those really interested in food supply.

Carnrick's Soluble Food : Lacto-Preparata, Beef Peptonoids, Dry and Liquid, alone, and with Coca, with Iron and Wine, Peptonized Cod-Liver Oil and Milk, Pancreobolin, Toilet Soap and Powders : Reed & Carnrick, 447 and 449 Greenwich Street, New York. Of these preparations, *Lacto Preparata* is a food for children six to eight months old. It is claimed to be similar to mothers' milk ; is made from cows' milk entirely, part of the casein being pancreatized and some of the fat being replaced with cocoa butter. The *soluble food* is for older infants ; is said to be made of partly predigested cows' milk, with the addition of dextrine and milk sugar. *Pancreobolin* is said to aid the digestion of fat, starchy, and nitrogenous food, increases peristalsis and softens the fæces. The *beef peptonoids* are claimed to be pure specimens of pure, partly digested beef. Manufacture open to inspection of physicians and chemists.

Teas : B. Fisher & Company, Greenwich and Jay streets, New York ; claimed to be economical, pure tea.

Cows' Milk and Butter : Echo Farm Company, 803 Fulton Street, Brooklyn. Milk in sealed bottles brought daily from farm and kept at low temperature ; is from carefully selected cows. Farm and dairy, mode of handling, etc., open to inspection. Same company furnishes also buttermilk.

Londonderry Spring Lithia Water, 335 Broadway, New York. Claims to be a natural solvent of uric acid, and to be useful in divers diseases.

Hoff's Malt Extract and Seltzer Aperient : Tarrant & Company, 278 Greenwich Street, New York. The malt extract is said to be a digestant as well as a beverage.

Johann Hoff's Malt Extract : Eisner & Mendelson, 6 Barclay Street, New York. Said to be a digestant as well as a beverage.

Murdock's Liquid Food: Murdock Liquid Food Company, Boston. A raw meat preparation said to be tissue constructive and easily digested.

Butterine: Oakdale Manufacturing Company, Providence, R. I. Claimed to be pure oleomargerine, made from carefully selected beef fat and good butter. Manufacture open to inspection of physicians. While it is not claimed that this is butter, it is claimed that it is as palatable and a good substitute for butter.

The Arnold Steam Sterilizer and the Steam Cooker: Wilmot, Castle & Company, Rochester, N. Y. Both are made on the same principle. Steam is evolved within three or four minutes. The appliances are durable, practical, and reasonable in price, and seem to be an advance over anything yet contrived.

Cibil's Meat Extract: Cibil Beef Company, Boston, Mass. Claimed to be a pure meat extract containing the stimulant and nourishing properties of beef.

Hygeia Water: Hygeia Sparkling Distilled Water Company, 353 West Twelfth Street, New York. Aerated, distilled, and effervescing mineral waters, claimed to be of exceptional purity.

Malted Milk: Malted Milk Company, Racine, Wis. Claims to be especially adapted to infants and invalids as a food; is said to be made of cows' milk, barley, and wheat, dextrine and milk sugar. Manufacture open to inspection of well-known physicians.

Nestle's Milk Food and Nestle's Condensed Milk: Thomas Leeming & Company, 55 Park Place, New York. The milk food claims to be a pure food for infants and invalids, made from cows' milk, a little sugar, and specially baked bread powder. The condensed milk is that generally known as "Nestle's Swiss Milk," from the milk of cows fed on the Swiss mountains.

Armour's Extract of Beef: Armour & Company, Chicago, Ill., and at 182 Duane Street, New York. Claimed to be a reliable extract.

Bovinine: J. B. Bush Manufacturing Company, 2 Barclay Street, New York. Is claimed to comprise "all of the extractive or albuminous properties of uncooked beef, together with its stimulating salts."

Ice Machine: L. Dermigny & Company, 126 West Twenty-fifth Street, New York. An apparatus to make ice and to freeze ice-creams and other ices in a few minutes; machines are ingenious, of various sizes. The ingredients used in the freezing compound are not stated.

Rex Wheat: Patent Cereal Company, 45 Pearl Street, New York. A preparation of wheat very palatable, and said to contain all the nourishing properties of wheat.

Strawberry Hill Pork Products: Dr. J. B. Learned, Florence, Mass. It is claimed that the pork, bacon, sausages, and lard exhibited were the product of healthy hogs, carefully and commodiously pastured, with clean sleeping and eating places, provided with an abundance of clean water, and fed upon sound food. Farm, hogs, and products open to inspection.

Aladdin Oven and Aladdin Cooker: Edward Atkinson, LL.D., Boston, Mass. These are noteworthy contrivances to save labor, fuel, and waste of food. The cooking with both is accomplished by the heat from a Rochester or other good lamp. In the oven the heat comes in contact with the inner sheet-iron box (or oven) in which the food is placed. An outer box of wood fibre keeps the heat from escaping, and keeps it in contact with the sheet-iron box. The "cooker" is a double box, the inner portion lined with metal. The object is to simmer or stew food economically. Both oven and cooker encourage prolonged cooking at a comparatively low temperature.

Hungarian Wines: Royal Hungarian Wine Cellars Agency, 60 Broad Street, New York.

CHEMICALS AND DISINFECTANTS.

The exhibit of chemical and pharmaceutical preparations was especially rich, and displayed in an admirable way the wonderful progress in modern processes in producing medicinal chemicals in a high state of purity.

Messrs. McKesson & Robbins had on exhibition an unusually fine display of fine chemicals, pharmaceutical supplies, adulterants of food, and apparatus suitable for a laboratory attached to boards of health, including a balance, microscope, camera for taking evidence in connection with nuisance, faulty drainage, and plumbing, etc., and the necessary glass and porcelain ware.

The following were among the articles exhibited : A non-conducting mat for bath-rooms made of cork ; sponges for surgical and bathing purposes ; toilet articles ; alboline, a permanent base for ointments, both plain and antiseptic. Coca leaves, with specimens illustrating the various steps in the manufacture of cocaine from them ; samples of ecgonine and methyl-benzoyl-ecgonine, the new synthetical cocaine prepared from the waste liquors from the manufacture of cocaine. The new synthetical antiseptic and analgesic known as exalgine (methyl-acetanilide) was shown in beautiful colorless crystals. Also a collection of chemically pure salts used in medicine, and a pretty complete list of drugs that have been used to adulterate articles of food, with a table showing the articles in which they have been found.

In the room adjoining this display was an exhibition of rarest beauty and cost, remarkable for containing in large quantities specimens of rare alkaloids and pharmaceutical preparations. It was shown by *E. Merck*, of 73 William Street, New York, as an evidence of progress in the manufacture of medicinal chemicals in a highly purified and perfect physical condition. A single case contained no less than one hundred and fifty articles aggregating in value $30,000. This exhibit of E. Merck has seldom, if ever, been excelled in value or beauty.

The exhibition of disinfectants and antiseptics was fairly well represented by the following firms :

The Carbolic Soap Company, 230 Pearl Street, New York, had on exhibition an assortment of their toilet and bath soaps, including Buchan's carbolic toilet soap, carbolic sulphur soap, carbolic tar soap, carbolic dental soap, carbolic medicinal soap, carbolic laundry soap, carbolic animal soaps, carbolic urinal soap, crude carbolic acid, and carbolic acid solution.

The Sanitas Company, of 642 West Fifty-fifth Street, New York, had on exhibition "Sanitas" disinfecting fluid, disinfecting oil, crude disinfecting fluid, disinfecting tooth powder, and disinfecting soaps. "Sanitas" is said by them to be prepared by oxidizing turpentine, in the presence of water, with atmospheric air. "Sanitas" Disinfecting Fluid : "An aqueous extract of air-oxidized turpentine. Its active principles include soluble camphor ($C_{10}H_{16}O_2$), peroxide of hydrogen, and

thymol." "Sanitas" Disinfecting Oil: "Air-oxidized turpentine. Its active principle is camphoric peroxide ($C_{10}H_{16}O_3$), a substance which produces peroxide of hydrogen when placed in contact with water or moist surfaces (wounds, mucous membranes, and other tissues)."

It is claimed for these preparations that the principal active agent, peroxide of hydrogen, is a *natural* disinfectant, and at the same time a harmless one and safe to be placed in the hands of the public, while many of the other commercial disinfectants are not.

Henry B. Platt, of 30 Platt Street, New York, exhibited his well-known solution of the metallic chlorides, "Platt's Chlorides." The claim is made for this solution that it is an odorless disinfectant and deodorizer.

Morris & Little, 175 North Tenth Street, Brooklyn, exhibited their disinfectant, "Soluble Phenyle," and other preparations made from it. The claims of this firm are that they present a very efficient, soluble (or easily mixable with water) disinfectant, not poisonous to human beings. They do not publish the exact composition of "Soluble Phenyle," but it is understood to be principally cresylic acid or cresol and other similar compounds prepared from coal tar, rendered soluble by the addition of an alkali.

The Germicide Company, of 862 Broadway, New York exhibited their system of automatic disinfection of urinals, water-closets, sinks, etc., illustrating the necessity for it by showing that water traps are not a perfect seal against the passage of gases through them. The system is, in brief, a reservoir of some convenient fluid disinfectant placed above the basin or closet, with a small pipe leading to the latter and having an opening of sufficient size to allow the disinfectant to escape, drop by drop, continuously. The disinfectant fluid is flavored with eucalyptus or other odorous liquid, so that the absence of the odor will be easily detected and will indicate when the reservoir is empty. The intent of this contrivance is to keep the traps and pipes of the house system continually in a disinfected condition.

Messrs. Seabury & Johnson, of 21 Platt Street, New York, exhibited a recently devised and apparently excellent spit-cup for consumptives; a variety of antiseptic dressings, adhesive

plaster, and an ingenious device for adding a disinfectant to the water in a water-closet flush tank before it is used—in other words, a device for flushing with a disinfectant solution. The device consists of a hollow wooden ball filled with the disinfectant to be used in the form of a powder. A small opening in the wooden ball allows the water to enter and the solution of the disinfectant to escape into the water of the tank.

Of the foregoing, your Special Committee recommends that Testimonials be awarded by the Local Committee of Arrangements to the exhibitors of articles, in its opinion, specially meritorious, as follows :

TESTIMONIALS.

American Washable Wall Paper Company, Deckertown, N. J. For Wall Papers that Wash and contain no arsenic.

Edward Atkinson, LL.D., Boston, Mass. For Aladdin Cooker and Aladdin Oven.

Backus Portable Steam Heater Company, New York. For the Backus Patent Portable, Open, Reflecting and Steam Radiating Heater.

Connolly Manufacturing Company, Brooklyn, N. Y. For Connolly Patent Globe Trap and Hopper Clamps.

John Cooper, Brooklyn, N. Y. For Vitrified Salt-glazed Sewer and Drain Pipe.

Dermigny & Company, New York. For the Family Ice Machine.

Durham House Drainage Company, New York. For the Durham System of House Drainage.

Henry Huber & Company, New York. For Indurated Fibre Bath-Tub.

The Dr. Jaeger Sanitary Woolen System Company, New York. For Pure Woolen Clothing.

Lewis G. Janes, M.D., New York. For Health Lift.

Marks's Adjustable Folding Chair Company, New York. For Adjustable Parlor, Library, Reclining and Invalid Chairs.

McKesson & Robbins, New York. For Chemicals, Laboratory Apparatus for Health Officers, and Sanitary Goods.

E. Merck, New York. For Rare and Valuable Medical Chemicals Illustrating Modern Progress in Medical Chemistry.

Miss C. N. Neal, New York. For the Neal Improved Infants' Portable Bath-Tub.

J. J. Powers, Sanitary Engineer, Brooklyn, N. Y. For Plan of Sewage Disposal Works.

Rockdale Sewer Pipe Company, Rochester, N. Y. For Vitrified Salt-glazed Sewer and Drain Pipe.

Seabury & Johnson, New York. For Antiseptics and Sanitary Spit-cups.

A. G. Spalding & Brothers, New York. For Gymnastic Apparatus and Anthropometric Instruments.

Rushville School Furniture Company, Rushville, Ind. For School Furniture.

C. B. Tefft, M.D., Utica, N.Y. For Family Garbage Burner.

Warner Brothers, New York. For Dr. Warner's Health Under-wear, Manufactured from Camel's Hair and Natural Wool.

George H. Warner, New York. For the Engle Fire Closet, for the cremation of garbage and other obnoxious substances.

Wells Rustless Iron Company, New York. For Rustless Wrought-Iron Steam, Gas, and Water Pipe.

W. Scott West, New York. For Plan of Filtration and Water Purification—the West Elevated Filter Beds.

Wilmot Castle & Co., Rochester, N. Y. For the Arnold Steam Cooker and Steam Sterilizer.

Your Special Committee further recommends the following as worthy of

HONORABLE MENTION.

Armour & Co., Chicago, Ill. For Armour's Extract of Beef.

Boynton Furnace Company, New York. For Gas-tight Self-Cleaning Furnace.

Theodore Bury, Cleveland, O. For Window Ventilator.

Bush Manufacturing Company, New York. For "Bovinine."

Cibil Company, Boston, Mass. For Cibils' Fluid Beef Extract.

Du Bois Manufacturing Company, New York. For McClellan Anti-Siphon Trap Vent.

Echo Farm Company, Litchfield, Conn. Echo Farm Products, Milk and Butter.

Franco-American Food Company, New York. For French Soups and Biardot's Soups for Invalids.

Daniel Green & Company, New York. For the Alfred Dolge Felt Shoes and Slippers.

Joseph Guy, New York. For Guy's Coronet Water-Closet System—for out-door use.

Mrs. L. Higham, Brooklyn, N. Y. For Health Waists.

Henry Huber & Company, New York. For Boyle's Patent Pneumatic Water-Closet.

P. H. Kahler & Sons, New York. For Boots and Shoes made on Hygienic Principles.

Thomas Leeming & Company, New York. For Nestle's Swiss Milk and Milk Food for Infants and Invalids.

Malted Milk Company, Racine, Wis. For Malted Milk for Infants.

Maltine Manufacturing Company, New York. For Maltine.

J. A. Missud, New Orleans, La. For the Missud Sewer Pipe.

Murdock Liquid Food Company, Boston, Mass. For Murdock Liquid Food.

Myer's Sanitary Depot, New York. For Siphon Water-Closet "A. G. M."

Patent Cereal Food Company, New York. For "Rex Wheat" Cereal Food.

Red Cross Section, Brooklyn, N. Y. For Completeness of Paraphernalia.

Reed & Carnrick, New York. For Peptonised Cod-Liver Oil and Milk and Beef Peptonoids, and Infants' Foods.

Richardson & Morgan Company, New York. For Improved Combination Heaters—Steam and Hot Water.

W. D. Van Duzer, Minneapolis, Minn. For Minnesota Sewer Flusher.

Respectfully submitted,

STEPHEN SMITH, M.D., Chairman, and in behalf of Special Committee on Exhibits and Awards

STATE SANITATION—PROPOSED REORGANIZATION OF LOCAL BOARDS OF HEALTH.

REPORT OF THE COMMITTEE ON HYGIENE OF THE MEDICAL SOCIETY OF THE STATE OF NEW YORK, AT THE ANNUAL MEETING AT ALBANY, FEBRUARY 5TH, 1890.

YOUR Committee on Hygiene would respectfully report that, in accordance with the instructions given at the last annual meeting of this Society, it has continued the consideration of more efficient sanitary administration in the local boards of health of this State. The following circular was prepared and sent to the chairman of the Committee on Hygiene of each county society having such a committee, and to the president of those lacking it.

ROCHESTER, N. Y., June 1, 1889.

During the past two years considerable discussion, as to means for increasing the efficiency of administration of local boards of health in this State, has resulted in a growing conviction that a change in their organization is necessary to ensure it. The Committee on Hygiene of this Society, at its last annual meeting, was instructed to report on this subject at the next annual meeting, in February.

The suggestion which this Committee would make, is the adoption of the *county* as the *unit of organization*, and not the *city* or *village*, as under the present order, making the county seat the sanitary centre, thus reducing the number of local boards; also making the position of health officer the prominent one of the board and ensuring capacity for the work with permanency in office and a sufficient compensation.

The following questions for reply by each county society are offered:

1. Are the local boards of health of your county as efficient and vigilant as desirable, if not, what are the apparent causes?
2. Would reduction of the number of boards, by adopting the county as the organizing unit, give better results?
3. Would the change in the position and circumstances of health officers, by the removal of political influences as far as

possible, and ensuring permanency in office, with adequate compensation, tend to greater efficiency?

Replies to these questions as much at length as possible, with added suggestions, are specially desired from each county society by this Committee.

All replies should be sent to the Chairman as early as possible, and not later than January 1st, prox.

E. V. Stoddard, M.D., *Chairman.*

To this circular formal replies were returned from fourteen county societies. From other counties a number were received from individual members who interested themselves in the subject.

The communications, with but a single exception, reply affirmatively to the questions of the circular. This expression of opinion encourages your Committee to believe that, if general and concerted action can be had on the part of the whole profession, a considerable increase in efficiency of our health boards can be secured.

The failures which are most apparent, in the present system of health boards in this State, were pointed out in the report of this Committee last year with the suggestion that changes, in the direction of the inquiries of the circular issued this year, would tend to increase the efficiency of the various boards throughout the State. The opinion expressed last year is strengthened by an additional year of observation and careful consideration.

We would specially emphasize the statement, that the *practising* physician does not make the best *sanitary* officer. While physicians ordinarily make good sanitary teachers, special training, other than the practice of medicine, is necessary for the successful sanitary officer. Yet the medical profession must be relied upon to furnish the personnel for trained sanitarians.

The practical sanitarian is devoted entirely to the prevention of disease, the medical practitioner to its cure; and, while the prevention of disease should and does form a prominent part of the duty of every medical practitioner, no argument is necessary to support the conclusion that those physicians whose whole energies are centred in the field of preventive medicine should be expected to excel those who endeavor to

be both medical practitioner and practical sanitarian at the same time.

We would place here our first recommendation, and that is that the position of Health Officer be more specifically defined and constituted.

The second most striking cause of inefficiency lies in the defective unit of organization.

The adoption of the town or village as the basis organization has inordinately multiplied the number of boards of health and detracted from their responsibility. Hence inactivity and indifference are common conditions, except when excited by the results of neglected causes. It is the opinion of your Committee that the adoption of a larger unit of territory, and a consequent lessening of the number of boards of health, would insure a closer and more active organization and greater efficiency.

In summarizing the replies to the circular upon this point, but a single individual reply can be reckoned as not being favorable to the change suggested as to the territorial limit.

In some of the replies to the circular, attention is called to the fact that, under the present system, two boards of health exist in the same locality, one representing the town and one representing the village, with the result that the village board is not actively efficient. The town board in these cases is reported as being the more efficient.

Without discussing the subject at greater length, the following conclusions are stated :

First, that the composition of the health boards of the State should be changed and more definitely prescribed.

Second, that the unit of territory should be changed to the county.

Third, that the position of Health Officer should be so modified as to place a trained sanitarian in the position ; and that changes, additional, as to his tenure of office, compensation, and other circumstances to be mentioned, be adopted.

In compliance with the instructions of the Society, a plan of organization, in accordance with the above suggestions, is herewith submitted.

First : To make the local health boards of the State county boards. It is to be understood that the change proposed

would except specially chartered health commissions now existing.

This division presents the advantage of having little more than sixty boards where now more than one thousand exist. The change would greatly simplify the relations of the State Board of Health with the various sections of the State.

The county seat would be the seat of the board of health and the residence of the Health Officer. All records and statistics would be there kept and easy of access. Carefully indexed records of births, deaths, and marriages, kept in accordance with a uniform plan, together with prompt and accurate reports of prevailing diseases, should constitute the principal matters of sanitary record.

Under rigid provisions, with penalty for failures, a certified transcript of vital statistics should be transmitted monthly to the State Board, and a weekly report of prevailing diseases also be made to the same body.

The number of the members of the board should not exceed five and should be constituted as follows : one physician of liberal education and of not less than seven years' professional experience ; one lawyer of corresponding professional attainments ; one member of capacity in the department of engineering ; one member representing the Chamber of Commerce or business element, and one representing the municipal authorities. Each of these members should be appointed on nomination or recommendation of the professional or other bodies which he represents. For each position two, or three, candidates could be presented, in order to avoid any question of personal favor or influence.

This board should be appointed by the supervisors of the county, and its members should receive a proper compensation.

The Board of Health, thus constituted, should appoint the Health Officer, who should, before appointment, be required to undergo an examination or be approved of by the State Board of Health.

His tenure of office should depend upon good behavior, and his salary be such as to demand his entire time to the exclusion of other occupation. It is important that much independence of action should be accorded to him ; hence the

powers of the Appointing Board should be advisory rather than to absolutely control.

The Health Officer should appoint his clerk and a special inspector for each sub-district in his county. These sub-districts should be based upon population, one being designated for each thousand inhabitants. The special inspectors appointed over these districts should, as far as practicable, be medical men of capacity for the work and be paid a fixed salary.

It should be a part of the duty of the Health Officer to secure free vaccination in his district, at stated times and places, at least twice in each year.

The careful and systematic inspection of all school buildings and inspection of the markets should constitute a part of his regular service.

It has been advised that the members of the board be paid. This is urged on the ground that competent service can be more certainly obtained. The salary of the members should be fixed, and they should be required to hold regular meetings, and so conduct them as to develop public interest in their observations of all conditions affecting the public health. The several health boards should be, as at present, subordinate to but in co-operation with the State Board.

The outline of organization here presented is intended to state the prominent points to which special attention should be given in order to secure effective sanitary administration throughout the State.

The change proposed is not radical. It does not remove the present system and substitute an entirely different one. It aims to improve the existing system by such changes as observation has shown to be desirable.

In its report of last year this Committee referred to the condition of the insane in our county almshouses, and this society adopted a resolution supporting the legislation which sought to make the insane in our county asylums the wards of the State.

The further experience of the year just completed leads your committee to reaffirm its conclusions. The report of the Special Commission in Lunacy is in our hands and is in the same line of investigation and of facts. The conclusions which

they have reached are identical with the position taken by this Society and with that of the Standing Committee on Lunacy of the State Board of Charities last year.

These two reports from independent committees, and coming from independent sources, considered together verify each other, arrive at the same conclusions, and make a decided case in favor of State care of the insane.

In the public institutions of the State no changes have occurred during the past year which demand special attention from this Society.

The prevalence of a very general epidemic of influenza during the past three months is reported. As it cannot be said to be caused in any way directly by unsanitary conditions existing in the State, this Committee does not consider it within its province to discuss the subject at this time. Any general results from its prevalence may be better commented upon after a longer period of observation than has been afforded. The visitation is slowly declining in prevalence in the State at large.

The members of your Committee report with sadness the death of one of their associates, Dr. William B. Brown, who died suddenly during the past summer. We would express our sorrow in the loss which we, as a Committee, have sustained and share that which has fallen upon the Society as a whole, in the death of an active and much esteemed member.

The following contributions to this report are appended as offered :

Report of the Committee on Hygiene of the Medical Society of the County of New York, by R. Van Santvoord, M.D., Chairman—

Removal of Manure ;

Report on the Public School Buildings and the Public School Systems of New York.

Respectfully submitted,

E. V. Stoddard, M.D.
A. N. Bell, M.D.
J. P. Crevelling, M.D.
William H. Bailey, M.D.
E. F. Brush, M.D.

SANITARY DEFECTS IN THE PUBLIC SCHOOL BUILDINGS AND THE PUBLIC SCHOOL SYSTEM OF THE CITY OF NEW YORK.

REPORT OF THE COMMITTEE ON HYGIENE OF THE MEDICAL SOCIETY OF THE COUNTY OF NEW YORK FOR THE YEAR ENDING OCTOBER 27TH, 1889.

FIVE years ago the Committee on Hygiene submitted a report on the Overcrowding of the Public Schools. This year the subject has again been taken up, and a more thorough effort has been made to detect possible defects.

In that report attention was called to the excessive size of classes. The Committee regrets to state that the same limits—viz., sixty in the grammar and seventy-five in the primary departments, are still allowed. An examination of the school reports for February, 1888, shows, however, on comparison with those of the same month for 1883, a slight decrease in the number of classes allowed to reach the maximum. The years preceding the months chosen for examination showed an average attendance as follows :

In 1888, 134,248 ; 1883, 122,822—increase, 11,426.

Notwithstanding this increase the following showing is made by the official reports of the average attendance in February, 1889, as compared with February, 1884. Classes reaching or exceeding fifty, sixty, and seventy :

February, 1884, 1,159, 389, 83 ; February, 1889, 930, 200, 41—decrease, 229, 189, 42.

This decrease is said to be due to a stricter enforcement of the regulations regarding air-space allowance, and does not result from any change of policy in regard to the size of classes.

The desirability of greatly lessening the size of the classes in the interest both of teachers and scholars is again emphasized. The rules respecting the authorized allowance of air and floor space per pupil appear, from the official report, to

have been rigidly enforced. In the old buildings the insufficient minimum allowance of five square feet of floor space and seventy cubic feet of air space for the lowest primary grades, and nine square feet of floor space and one hundred cubic feet of air space for the highest grammar grades are still adhered to. There is reason to suspect, however, although the Superintendent of Schools is undoubtedly earnestly enforcing this rule, and the official reports show a very commendable observance of it, that it is in some instances evaded by teachers or principals under pressure of excessive applications for admission, or for another reason to be mentioned further on. It is a simple matter to make a temporary transfer of pupils from an overcrowded class to one not entirely full during an official count in order to prevent an evident violation of the rule.

During the last five years the average attendance in the public schools has changed from 122,822 to 134,248; an increase of 11.426. During this same period the seating capacity of the public school buildings has increased 35,932, or more than three times the increase of average attendance. The total number of pupils refused admission to the public schools in 1883 was 7490, in 1888 it was 14.085. These figures include a certain number of cases in which the same child has applied more than once, and some probably who have ultimately been received. There are said to be, however, a very considerable number of parents who do not attempt to put their children in school at all, being discouraged by the unsuccessful attempts of their neighbors, so that the figures as given probably do not overstate the number of children unprovided for. The rapid filling of new schools in populous neighborhoods indeed suggests that the figures are too small.

The apparent contradiction between the facts that so many children have been rejected, although the seating capacity has been increased so greatly, arises from the fact that the resident population of the city is greatly diminishing in certain localities, leaving a large number of school buildings partly empty, while in certain other localities the growth of population, fed by removals from other portions of the city, as well as from the outside, greatly outstrips the school accommodation provided.

The construction of the new school buildings shows a most commendable advance in every respect. Although the allowance of floor and air space is still published in the manual of the Board of Education, as given above, there has been allowed in the newest buildings one hundred and sixty-five cubic feet of air space and eleven square feet of floor space to each scholar in all grades.

The water-closets provided consist of individual bowls or shallow troughs, which are thoroughly flushed at short, regular intervals by an automatic mechanism. The urinals for boys are similarly provided. The filthy habits of the pupils alone prevent these appliances, as inspected in actual operation by a member of the Committee, from being ideal.

It was noted that in the closets there was no toilet paper provided. In a conversation with a physician who visits the schools in an official capacity, attention was called to the fact that much of the bad odor of class-rooms comes from the uncleanliness of the scholars themselves. It is astonishing that the means of avoiding one obvious source of offensiveness is not furnished.

Ventilation is provided for by transoms over the windows, perforations of the bottom of the lower sash, guarded by a box to direct the incoming air upward, and by two shafts in each room, opening by registers sixteen by twenty-six inches at the top and bottom of the room. These shafts all empty into a chamber in the attic which communicates with the outer air, and is heated by a steam coil to ensure an upward current. The play-rooms in the basement of the buildings are open to the outside air. The staircases open into these rooms unobstructed by doors, so that fresh air is constantly ascending into the halls of the buildings through them.

Heating is by radiation from steam radiators and coils in the rooms in the large buildings. This method has been found to give a much more even heat throughout a large building than any form of hot-air furnace. The first cost and cost of fuel is much less. The provision for fresh air supply from the outside is said to be sufficient to offset that which would be provided by a hot-air system. With direct radiation class-rooms are comfortable at 65°, which would, with heating by hot air, have to be heated to 70°. The Committee has had no

opportunity to test these assertions by actual observation, but the testimony of teachers, as far as obtained, is very favorable. Heating by hot air is used in small schools.

In the new plumbing work galvanized iron pipes are used in place of lead for water. Wrought-iron pipe, glazed on the inside and with screw joints, is used for soil pipes. Provision is made against the blocking of the soil pipes by careless or malicious individuals by making the first limb of the trap narrower than the portion beyond, and by increasing the size of the successive lengths of soil-pipe from the trap outward. Any foreign body thrown into a closet must accordingly be arrested within reach in the trap or be carried into the sewer. The value of such an arrangement is obvious to any one acquainted with the number and nature of articles which are often thrown into water-closets.

In the old buildings the present Superintendent of School Buildings has substituted iron water tanks and pipes for lead. Iron drain-pipes have been substituted for earthenware and have been put above ground. Cellars have been properly drained. The old school sinks are being gradually replaced by one or other of the above-mentioned automatic flush arrangements.

All of this shows a very great improvement, an advance perhaps quite as rapid as can reasonably be expected, considering the enormous expense involved. The new buildings seem to leave little or nothing to be desired. The only danger threatening them is lest, owing to the rapid increase of population, the pressure for admission may become so great as to force the Board of Education back from the higher standard established and induce them to divide up the rooms, putting, as they have done in at least one school, two classes into rooms intended for one.

Last fall the Committee issued a circular to every member of the Society, requesting a statement of facts showing specifically the effects of the present overcrowding and other sanitary defects of the public schools on the health of the scholars. To this circular only fourteen answers were received. These answers contained very few of the specific facts desired—*i.e.*, statements of specific cases of illness directly traceable to sanitary defects in school buildings. Several important defects in

the management of the schools were, however, brought to notice, and will be briefly commented upon. Dr. A. Seibert states that children are "punished for absence due to illness, for they are not dismissed early on Friday afternoon, as are those who are well all week. In this connection may be recorded also the statement, made verbally to a member of the Committee—viz., that it is the custom on stormy days not to allow the scholars to leave the building during the recess, and not to dismiss them until 2 P.M., the result being that many children are obliged to go without food from breakfast-time until the middle of the afternoon. The result is that many ambitious children (in particular girls) will not mention any headache or soreness of throat to their parents in the morning before going to school. Diphtheria may be, and often is present, and is thus brought into close contact with a large class of children." The doctor calls attention to the danger of transmitting disease by kissing, and regards the present recess of one hour as too short, digestion being impaired by hurried eating, running, and anxiety about being late to school.

The following is quoted from a letter from Dr. A. S. Daniel, Out-door Visiting Physician to the New York Infirmary for Women and Children :

"I should like to make a statement in regard to the fact that permission is given to children suffering from pertussis to attend the parochial schools, the schools of the Children's Aid Society, and the Wilson Mission Industrial School. This week I received a letter from a teacher in one of the above schools protesting that a family of children should be allowed to attend this school while suffering from whooping-cough, owing to the fact that the teacher's salary depends upon the attendance of the children in the public schools. I repeatedly know of children who should not be permitted to be out of doors going and even being sent for by the principal to come for their marks and remain an hour or two in school."

This statement certainly points to a very grave defect, if such occurrences are frequent.

Reference to the manual of the Board of Education shows that schools are classed according to the average attendance of the preceding year. The salary of the principal and of a

certain number of the teachers is determined by the average attendance. It is obvious that when a school is near the border-line which separates two of these grades, and an average attendance of a very few one way or the other will make a difference of two hundred and fifty dollars in the salary of the principal, the temptation to such acts as are certified to by Dr. Daniel must be strong. This temptation has of late been lessened by the Board of Education, in that the salaries of teachers are no longer reduced when the attendance falls off sufficiently to lower the grade of the school. When a new appointment is made to fill a vacancy in a declining school, the salary of the new teacher is fixed according to the regular schedule.

In order to obtain more information about the abuses mentioned by Dr. Daniel, a circular letter was sent to most of the district physicians attached to the dispensaries of the city. Eight responses were received. Six of these reports stated that no such occurrences as had come under the notice of Dr. Daniel had been observed by them. Dr. J. P. Janniski stated that in his experience principals and teachers went to the other extreme "in not permitting children to attend school, whose only fault was that it was rumored that there was sickness in the house." Dr. William L. Stowell states that in his district teachers were very particular to "send the children home when they knew of contagious diseases existing in such a family." He further states that he does know "that children attend if the case is not reported to the Board of Health, this being the fault of the physicians more than (cf.) parents or teachers."

These replies seem to show what, indeed, might be presupposed, that there are few teachers stupid enough to risk the spread of contagious diseases among their scholars by violation of the rules concerning them, even if they are controlled by no higher consideration than self-interest.

On the other hand, Dr. E. J. Lorenze writes: "It certainly is true that sick children are very often retained in school when they should be in bed. This is especially true in diseases shown for the first few days in malaise and obscure symptoms. I have also known several instances where delicate children (children who were scrofulous, tuberculous, and

also those suffering from constant headaches, constipation, anæmia, etc.) were obliged to appear in school as early as 7.45 or 8 A.M., in order to prepare blackboard exercises, books, etc., for the pupils. This is what the teacher thinks is 'favoritism.' These 'favorites' do not keep up this hard work very long, and are obliged to give way to more 'favorites' or 'pets.' I speak from personal experience with my nephews in the public schools. It is also a common expression with the children met with in private practice that 'the teacher keeps us in,' in special reference to the request to go to the yard to obey the calls of nature, and also to the habit that the teachers have of making pupils, for slight offences committed, to stay in the class-rooms for hours, depriving them of their lunch or dinner."

Dr. J. G. Smith writes: "Your letter of inquiry as to the custom of principals and teachers of public schools inducing pupils to attend who are sick or too ill to attend school session has been received, and in answer I would respectfully state that parents and guardians are aware of such practices in general, and I have noticed in visits to school class-rooms that there are weakly, anæmic-looking, and weary-acting children present."

Other correspondents, in answer to the first circular of the Committee, call attention to the evils resulting from competition among the children, fear on the part of timid children to ask to leave the class-room when necessary, and other evils almost necessarily resulting from the teaching of children in large masses which we cannot mention in detail.

Dr. N. J. Hepburn called attention to the difficulty that he has experienced in keeping children with eye troubles out of the public school connected with a certain public institution, he having had to resort to the expedient of putting children to bed in order to prevent them from being sent into the school-room. He writes: "In general I find in dispensary work that teachers tell children that if they stay away their places will be filled and they will not be taken back when well. Some few teachers will not allow a child with a sore eye to attend school, but they are greatly in the minority."

Drs. G. F. Morris and Frank Livermore, Health Board Inspectors, in response to inquiry, wrote: "We are of the opin-

ion that the practice of inducing children ill with or convalescing from contagious diseases to attend the public schools, for the purpose of increasing the average attendance or to prevent a reduction of salaries, does not exist ; but that the principals have generally shown a desire to comply with Section 98 of the Sanitary Regulations of the Manual of the Board of Education. The enforcement of Section 97, regarding vaccination, is sometimes not strictly carried out for the very reason of keeping up the average attendance ; since the children might go to private and parochial schools, where the laws of the Board of Education would be inoperative.

" Dr. Van Santvoord's informant referred principally to schools of the Children's Aid Society and to parochial schools, where the practice of allowing children having whooping-cough to attend may possibly exist.

" Our observation leads us to report that in schools of the same ward there is an overcrowding in some, while there are many empty class-rooms in others. This overcrowding is not so apparent in the number of sittings, although the insufficient cubic air-space allowance (*vide* Section 95, Manual Board of Education) is sometimes trespassed upon, as in the foul-smelling atmosphere of the class-rooms."

In connection with the above attention should be called to the fact that complaints have reached the Superintendent of Schools that some dispensary physicians are in the habit of refusing to give vaccination certificates unless paid for them. (See Dr. A. S. Daniel's letter before quoted.)

The evidence thus submitted to the Committee brings to light some grave defects. The evils above recorded arise, in most instances, from the direct pecuniary interest that principals and teachers have in securing the highest possible average attendance from the large size of classes, the insufficient allowance of air space, and the deficient supply of schools in rapidly growing parts of the city. The good effects claimed for the salary system are that it increases the efficacy of the schools by securing emulation between them, secures regularity in attendance, and prevents teachers from acting inconsiderately toward scholars. The attempts at violation of the rules regarding contagious diseases were reported as occurring, *not* in the public schools proper, but in those of the Children's

Aid Society and the Wilson Mission industrial and parochial schools, except in cases of ophthalmia. There is evidence which shows that this system of paying school officers leads to evasion of the rules forbidding overcrowding, to the retention in the class-room of children who ought not to be there by reason of non-contagious illness or illness not recognized as contagious, and to evasion of the regulations regarding vaccination. The temptation to transgress in this regard would be apparently, in part, done away with if salaries were based on average enrolment, instead of on average attendance. A classification wholly independent of the average attendance would be more radical. The question is, however, so complicated that the Committee does not feel competent with the information at its disposal to make a definite recommendation concerning it.

One thing has been brought out prominently by the Committee's inquiry—viz., that whatever may be the sanitary defects in the public school system, they are probably trifling compared to those of parochial and Sunday-schools. The principal of one of the large public schools called attention to the fact that, to his personal knowledge, children who were excluded from his school on account of the existence of contagious disease in the family were admitted to a certain Sunday-school. It was in schools not directly under the control of the Board of Education that the presence of children suffering from pertussis was desired.

The rigid discipline which leads to refusals on the part of teachers to children who really need to leave the room must be rendered necessary, in part, by the size of the classes.

Based on the above, the Committee respectfully submits the following :

1. The system of marking and rewards for regular attendance of school children should be so adjusted as to impose no avoidable penalty for absence on account of illness.

2. The recess at noon should last at least one hour and a half. No scholar should be detained for any reason during the noon recess.

3. The salary of principals and teachers should be less directly dependent on the average attendance than it now is.

4. The regulations which are in force regarding vaccination

and contagious diseases among public school children should be extended and rigidly enforced in all day schools, including all private and denominational schools of every description. The regulations regarding contagious diseases should be extended to and rigidly enforced in all Sunday-schools.

5. The construction of new school buildings should be pushed forward as rapidly as possible, in order not only to accommodate those who are not provided for on the present basis, and to prevent overcrowding according to existing standards, but to render possible the raising of the standard to not less than two hundred cubic feet of air space to each scholar, and a reduction of the maximum number of scholars allowed in each class to thirty in the grammar and forty-five in the primary department.

R. Van Santvoord, M.D.
William H. Flint, M.D.
Joseph A. Andrews, M.D.
Cyrus Edson, M.D.
Sanger Brown, M.D.

SANITATION IN SPAIN.

Sanitary arrangements, as carried out still in many parts of the Continent, are very far below what we in England regard as even the normal standard. The following amusing account, from the pen of Mr. Paul Planet, co-editor of the *Semaine des Constructeurs*, of the sanitary circumstances of the Spanish capital city and of the second largest town, would tend to show that Spain should be the Arcadia of the sanitary engineer :

" In Spain water-closets are unknown, and while the primitive ' stick over a dike ' is not yet discarded by the lower folk, the better classes have made no further advance than the provision of earthenware jars or vases, often ambitiously adorned with antique figures and made after classic shapes. We remember on the very first day of our reaching Madrid, when timidly asking in a phrase the more awkward because we were not masters of the tongue, for a spot withdrawn where,

like the misanthrope, we might have the freedom of a little reflection, etc., being triumphantly led into the kitchen. A doorway without door gave access to a room encumbered with colossal vases of the shape of those formerly called 'Bolivar,' and which we have seen only in Spain. The kitchen was filled with women, who chattered together in that sharp tone peculiar to the Castilians. 'Embarrassment was there among them?' Not the least! On the contrary, they took an interest in us, ascertained our wants, and busied themselves about fulfilling them. On the other hand, our embarrassment was extreme; how we would have preferred that our *vis-à-vis* were only classic imitations like the ceramic productions around us! Below all this, however, there was only an amiable simplicity which attached to things no greater weight than they merited. This is a trait of the *peuples méridionaux*. Again, we remember at Valladolid, in one of the most comfortable hotels of the town, that the corridor which lead to the first floor of the inner *patio* was furnished at each end with a monumental jar, of exactly the same shape as those which might have served for Ali Baba's forty thieves. They were well above two metres in height, and a stool helped to the ascent of them and the settling in position. The guest simply seated himself over the opening, which was closed by his presence. This, of course, was a very primitive arrangement. But there was something much more primitive still. When we, with that vacant and indifferent air which one assumes in similar cases, reached the gallery, two persons of the amiable sex had already, without ceremony, appropriated the two jars next the open air. Our first thought was to retire; but we were called back and asked to have a little patience. The ladies resumed their talk, and exchanged words with the *criadas* or servants passing through the *patio;* while the muledrivers, who were harnessing the mules a little farther off, laughed and offered their comments. Some peacocks called aloud, the sun shone. . . . The whole scene was, indeed, curious. But it became disagreeable when we in our turn had to appear on the scene. We have become a little used to these traditional habits since then, but at the beginning we felt all the awkwardness inseparable from a first attempt."—*Plumber and Decorator.*

PURIFICATION OF THE AIR FROM HOT-AIR FURNACES.

AN APPARATUS FOR THE CHEMICAL AND MECHANICAL CLEANSING OF AIR IN THE CHAMBER OF A HOT-AIR FURNACE.

By SAMUEL G. DIXON, M.D., Professor of Hygiene, University of Pennsylvania.

OWING to the fact that the manufacturers of hot-air furnaces have signally failed to furnish the market with that which will not permit the products of combustion from escaping through the joints of the drums or the fire-box into the hot-air chamber of the apparatus and from there into the rooms of the building, rendering the atmosphere of the apartments deleterious to the health of the occupants, I propose to convert some of the irritating and noxious gases into the salts of calcium sulphite, calcium sulphate and calcium carbonate and into water, and also to remove much of the dust from the air before it is admitted into the hot-air flues.

The chemical reaction that takes place when sulphurous acid gas and carbon dioxide, in the volumes usually found in the hot-air coming from hot-air furnaces, is brought in contact with calcium hydrate [lime-water] is, as shown by the following formula :

$$3Ca[HO]_2+2SO_2+CO_2+4O=CaSO_3+CaSO_4+CaCO_3+3H_2O.$$

To accomplish this reaction the gases must be brought in contact with the calcium hydrate, and to this end the apparatus about to be described has been devised.

" A" represents the hot-air chamber into which the non-hygienic gases already referred to escape from either the fire-box or the drums of the furnace.

" B" shows the hot-air flues through which the heated air is furnished to the rooms of a building.

" C" indicates an air-chamber divided off from the regular hot-air chamber of the furnace, excepting a communicating aperture through the centre.

" D" is the aperture connecting the two hot-air chambers.

"E" represents the ends of four rollers that extend from one side to the other of the chamber "A."

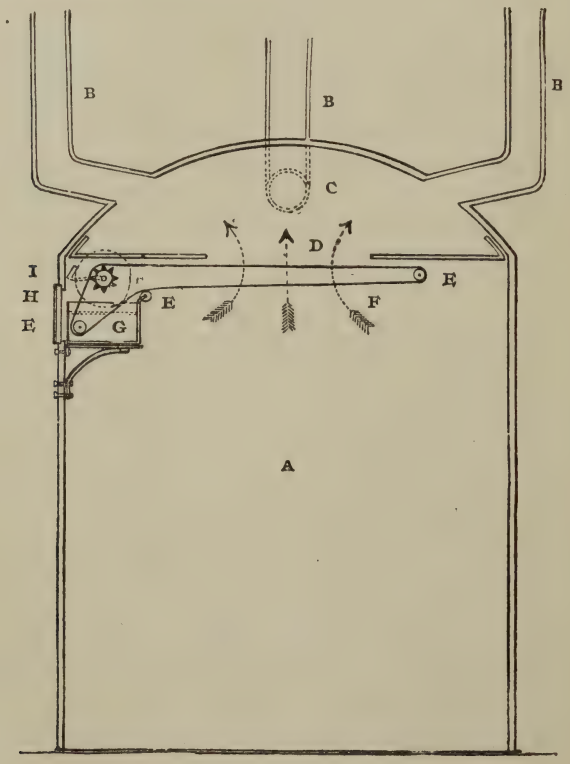
"F" pictures the edge of a piece of cheese-cloth stretched over the four rollers. This cloth is pierced with holes. They are so arranged that those on the upper stretch alternate with those through the cloth on the lower stretch.

"G" shows the end of a tank. This is supported by a bracket fastened on the wall of the furnace.

"H" shows a door situate immediately back of tank "G."

"I" represents either a crank extending from the upper left-hand roller [this particular roller is provided with short teeth or cogs], or a shaft extending through to the outside of furnace wall.

The working of the apparatus when adjusted, as shown by the accompanying drawing, and with tank "G" filled with lime-water, will be as follows :



. By turning the crank "G" occasionally by hand, or if a shaft it will be kept in constant motion by a weight attached to a series of cogs. This will keep the cheese-cloth, "F," continually wetted with calcium hydrate, the rollers being, as shown on the plate, so arranged as to dip the cheese-cloth into the tank of lime-water. These rollers stretch the dampened cloth across the aperture connecting the upper and lower air chambers, "A" and "C." From the fact that the holes in the cheese-cloth, through which the air passes from the lower to the upper chambers, alternate, the air in ascending either impinges on the lower or upper stretch of the cloth wetted with calcium hydrate, breaking up the lime-water and the sulphurous gases and the carbon dioxide. The damp cloth also retains much of the dust and many of the micro-organisms out of the air. The air ascending into the upper chamber is purified and cleansed.—*University Medical Magazine.*

THE CAR STOVE DISCARDED.—Happily, in the State of New York, the law passed a year ago, making it a misdemeanor under penalty of $1000 for each offence, and an additional penalty of $100 for each day during which such offence is continued, to use stoves, in passenger cars, has gone into effect. Various systems of heating by steam have been adopted, and although none are yet perfect, and there are consequently many complaints, there is reasonable ground for belief that the time is not far distant when there will be no cause for complaint. The New York Central has adopted the Master system, which is a simple arrangement of pipes along the sides of the car, with spurs or elbows projecting under the seats and a connection through the floor at the centre with the main or feed pipe beneath. All the pipes dip toward a common centre, so that the water formed by condensation drips into a trap, which by a peculiar mechanism opens and shuts automatically, always remaining closed while the steam is on, and opening as soon as it is cut off, thus having the quality of being steam-proof without being water-proof. The device is operated by the difference in expansion and contraction between a brass cylinder and a cast-iron frame supporting it. By its use the pipes are kept clear of water and the steam,

coming as it does from the dome of the engine, is always dry. At the point where the main or feed-pipe is connected with the piping in the car there is a three-way valve, by the simple turning of which the steam may be cut off without interfering with or in any way affecting the rest of the train.

LUMINOUS PAINT.—Until recently the commercial manufacture of luminous paint has been confined to England, where a single factory turned out a small supply at a price of about $3 a pound. This enormous cost seems to have prevented the use of the paint except as a curiosity. During the past year, however, a firm in Austria has found means to produce it and place it on the market at fifty cents a pound, or about one sixth of the English price. Even at fifty cents a pound, a substance composed of roasted oyster shells and sulphur might be manufactured at a good profit, but at that price it is likely to come into extensive use. Wherever it can absorb light during the day it will give it forth at night, and it is said that a railway car in England, which has had its ceiling painted with it, was so brilliantly illuminated that one could see to read a newspaper in it during the darkest night, without other light. With all due allowance for the enthusiasm of early experimenters, there is no doubt that cars with ceilings so painted would be pleasant to ride in whether one could really see to read in them at night or not ; and for making keyholes, stairways and signboards luminous, the paint would be invaluable. Its application to stairways is a particularly obvious one, and the Austrian manufacturers furnish a kind of wall paper on which the paint can be used to better advantage than on the bare plastering. The paper, which is of a leathery texture, is first treated with lime water, and then primed with a composition, furnished by the same firm. After this is dry, two thin coats of the luminous paint are applied, and the whole may then be varnished.—*American Gas-Light Journal.*

NEAR-SIGHTEDNESS is over-running the French people as much as the Germans. Among the senior boys in the different French colleges more than forty-six per cent are near-sighted.

THE ISOLATION OF CONSUMPTIVES.*

By Paul H. Kretzschmar, M.D., of Brooklyn, N. Y.

At the Congress of American Physicians and Surgeons, held in Washington during the month of September, 1888, one of the most prominent members of the profession, from the city of New York, made the statement that the time had come when pulmonary consumption should be classified among the contagious and infectious diseases, and consumptives should be cared for in like manner as small-pox patients are. At that time the writer entered his protest against any such proposition ; but so much has been said since, regarding the probabilities of transmitting the disease from the patient to the healthy, that a discussion of this very important subject seems to be advantageous.

The fact that the "International Congress for Tuberculosis," which will meet in Paris this year, has among other subjects the question of "Isolation" on its programme, is evidence that a portion of the medical profession *does* seriously consider the advisability of such a proposition. Since Dr. Koch first demonstrated the specific cause of tuberculosis, it has been asserted that consumptives are a source of danger to their surroundings, and it has been claimed that many cases of pulmonary tuberculosis are directly traceable to infection by contact only. As long as one hundred years ago the theory, now preached by many, that consumptives are liable to infect healthy persons by contact *only*, was accepted as a fact, and appropriate laws were issued. In Naples a law existed during the latter part of last century for over fifty years, compelling the attending physicians to report every case of pulmonary consumption—l'ulcera pulmonale—and the fine for the first failure to comply with this law was three hundred ducats, to be followed, in case of repeated neglect to report this class of cases, by expulsion from the country for a period of ten years.†

* Read at the meeting of the Medical Society of the State of New York, Albany, February 5th, 1890.

† *Berliner Klinische Wochenschriff*, 1883, No. 24.

All poor consumptives were at once removed to a hospital; the clothes and bedding belonging to consumptive patients had to be destroyed after death; the dwellings of all patients who were fortunate enough to die outside of the hospital had to be entirely renovated and nobody was allowed to occupy them until one year afterward. Similar laws and restrictions were in force in Portugal, without, however, influencing the prevalence of pulmonary consumption in any marked degree. Rigorous laws, strictly enforced for fifty-six years, would certainly have shown *some* favorable results, if isolation and *public supervision* of consumptives were of any practical value whatsoever.

In a paper read before the American Public Health Association, during its meeting in October last, the writer used the following language: "If the advocates of isolation would reflect for a moment and consider the hardship and injury which would follow its introduction, affecting, as it would, a large proportion of the human race and seriously interfering with our entire social life, without giving the slightest assurance of better results than those obtained after many years of trial in Naples and Portugal, one would think that they would hesitate to advocate so inhuman a proposition. It will not be denied by them that a very large proportion of consumptives are phthisical subjects long before they themselves are aware of it, and even physicians frequently treat alveolar catarrh as bronchitis until the microscope demonstrates the fact that the patient's expectorations are full of tubercular bacilli. What benefit would be derived by isolating advanced cases of pulmonary consumption, if cases during the early stages are permitted to deposit millions of microbes with their expectorations upon our streets, in our churches, public halls, railroads, and all over their own residences? And finally, what advantage would it be to have isolation enforced in the State of New York and not in New Jersey, Pennsylvania, or other neighboring States; or, if adopted by the United States and not in Canada?"

Careful consideration of the subject has strengthened the writer's former opinion about the infeasibility, cruelty, and absurdity of any attempt to carry into practical effect the teachings of those advocating isolation of consumptives for

the purpose of diminishing or destroying the danger of infection, although it is admitted that, *theoretically*, the isolation *of all consumptives* would do much to lessen the quantity of tubercular bacilli floating in the air, and thereby the danger of infection. *Practically*, the same favorable results would be obtained if the lessons taught by Dr. George Cornet's experiments would be made the basis for proper teachings regarding the expectorations not only of people known to be consumptive, but of all persons suffering from prolonged coughing depending, apparently, upon other deranged conditions of the human system. We know that the source of contagion is contained in the sputa; we also know that as long as these expectorations remain in a moist state they are not apt to infect anybody, but that the dry sputa, becoming pulverized, allowing the poisonous germs to be carried away into the surrounding atmosphere, are alone responsible for the dissemination of the disease. The short pamphlet issued by the Board of Health of the City of New York regarding this matter gives most excellent instructions, and it seems to the writer to be an act of vital importance for this Society to do *its share* that these instructions, or others of a similar character, be published by every health officer or every county society of this State.

To obtain the views of the most advanced phthiso-therapeutists the writer entered into correspondence with some of them. Dr. Hermann Weber, of London, England, writes under date of January 2d, 1890: "In answer to your note I beg to say that it would not only be a great cruelty to isolate consumptive patients, but it would also be an impossibility. . . ." Dr. P. Dettweiler's answer is dated Naples, December 24th, 1889, and reads, . . . "regarding the effect of isolating consumptives, I can only say most minute cleanliness, the rigorous use of the spittoon, and the general introduction of the 'blue flask' are the best means to prevent the spreading of the disease; isolation is unnecessary." Dr. Ernst Meissen, of Falkenstein, Germany, writes December 19th, 1889, about as follows: "The isolation of consumptives is cruel, not practical, and unnecessary." Dr. Cornet's investigations have proven the latter. Every possible effort should be made, of course, to destroy the dangerous tubercle bacilli, and thanks to Cornet

we are now in a position to do that much more effectually than formerly. The term "intelligent spitting" does not sound pleasant, but these two words express best what will do *most* to diminish the number of the germs producing pulmonary consumption floating in the air which we breathe. If in hospitals and in private practice sufficient attention would be given to this most important matter great progress would be made toward lowering the death-rate from pulmonary consumption. It is our most solemn duty as physicians to see to it, that the public is not only duly instructed about the value of "intelligent spitting," but also that it is carried into practice.

The "blue flask," referred to by my friend, Dr. Dettweiler, is intended for use among consumptives; it has been devised by him and was exhibited at the last Medical Congress of German Physicians, held at Wiesbaden, in April, 1889. The writer fully appreciates the importance of Dr. Dettweiler's invention and takes pleasure in presenting the "blue flask" to you for your inspection and consideration. There may be room for improvement in the make-up of the flask, but the principle involved in its use is of the greatest magnitude, and it is to be hoped that the lesson which its use teaches will be carried by you into every household where consumption exists, and that the patients will be so thoroughly impressed with its importance that spittoons, partly filled with appropriate fluid and frequently cleaned, will soon be found in every room, and that patients will know what to do to relieve their friends of the danger of becoming infected by their carelessness.

Permit me at this time to digress for one moment from the subject under consideration, to pay a well-earned tribute of gratitude and admiration to the memory of the late Dr. Hermann Brehmer, of Goerbersdorf. He died on December 22d, 1889, from pneumonia, just before my letter, asking for his opinion regarding the isolation, reached Goerbersdorf. The medical profession loses by his death one of its brightest stars, and those especially interested in the subject of phthiso-therapy their foremost teacher, writer, and active practical worker. For over thirty-five years Dr. Brehmer conducted his now world-renowned institute, for the cure of consumption, in

Goerbersdorf ; beginning with almost no capital and upon the smallest scale, his institution has grown to a most marvellous extent, and more than 14,000 patients have visited it during the last three decades. Of Dr. Brehmer's writings the most important are : " Chronic Pulmonary Consumption and Tuberculosis of the Lungs : Its Cause and Cure," published in 1857 ; " Etiology of Chronic Pulmonary Consumption," 1885 ; " The Treatment of Chronic Pulmonary Consumption," 1886, second enlarged edition, 1889, and his latest work, " Communications from Dr. Brehmer's Institution for the Cure of Consumptives, in Goerbersdorf," 1889.

Strongly opposed to *isolation* of consumptives for the purpose of diminishing the spread of the disease, the writer is one of the most enthusiastic advocates of the *separation* of consumptives from the healthy, and their removal to institutions properly conducted and located, and conducted solely for the cure of this class of patients. It is a great pleasure to the writer to see that the profession in France—as shown by the writings of Professor Nicaize and Drs. Daremberg, Pouzet, and Frémy—is adopting the view that consumptives find the greatest probabilities for a cure within sanitoria and not in so-called open " health resorts." The excellent results obtained in the Adirondack Cottage Sanitarium by Dr. E. L. Trudeau, of Saranac Lake, are so encouraging, that it is surprising that other institutions of similar character have not been established, and it is to be hoped that the profession in the United States will soon recognize the importance and the value of special institutions for the cure of consumptives.

I repeat what I stated in a paper read before the American Climatological Association in Boston, during the month of June, 1889, that : " If anything is to be done tending to restoration to health for those who are consumptive, whether rich or poor, it can be accomplished with the greatest promise of success in a properly located and rationally conducted sanitarium."

FOOD IN THE TREATMENT OF PULMONARY CONSUMPTION. —In phthisis, there is an imperfect metabolism of carbohydrates. Experience shows a nitrogenous dietary to be best.

Debove has shown that consumptives can assimilate a quantity of food far in excess of the needs of the healthy organism. This excessive quantity should be supplied, though resort to the stomach-tube can be reserved for special cases.

Meat, principally beef, with milk, fish, eggs, leguminous vegetables and greens, should form the bulk of the dietary, with fat in large quantities, if necessary, cod-liver oil or oleaginous inunctions. Alcohol is a food in consumption; it should be combined with malt, milk, glycerine, or cod-liver oil. Not more than three, at most four hours, except during sleep, should be allowed to elapse without taking food. Milk punch on going to bed, and a glass of wine or spirits with liquid peptonoids in case of waking during the night are strongly urged. Hot water before meals, lavage, if necessary, and the free drinking of water are essential. Predigested foods may be employed with great benefit, especially peptonized milk and beef peptonoids. In case gavage is resorted to, they should be used almost exclusively. Gavage is best preceded by lavage with an alkaline solution and chloroform-water.—*Solis Cohen, in Medical Record.*

THE CONSTITUTIONAL LIABILITY TO DISEASE.

By M. H. Simons, M.D., Surgeon, U. S. Navy.

In The Sanitarian for January there is an article by Dr. Schilling on "Heredity in Disease." Dr. Schilling expresses the view which is principally held and affirmed by the German schools with true national dogmatism, that there is no hereditary transmission of disease, but only of a disposition, by reason of imperfect cell-growth or arrangement, to diseases, and that the disease which arises is simply determined by the exposure at the right time, for a longer or shorter period, to the attacks of a peculiar microscopic organism. I do not dissent from the abstract proposition that the actual disease is not transmitted, but to the statement that its outbreak is always caused and its variety determined by some peculiar organism. It is apparently pretty well established that Americans are too apt to accept or acquiesce in the views of any

European who may propound them with sufficient assurance and loudness, and, very much, it seems to me, as we accept our fashions, because we are afraid that we shall be considered ignorant or provincial, if we do not. The German professor with the microscope has done noble work, but the microbe is being overworked. On every possible occasion his worshippers get him under way and crowd him over the course with many guttural exclamations of pride and admiration. They make him dive and hide and bore ; but they have painted him in colors of gold and carmine, so very soon some one with a little eye-piece spots him in his hiding-place, and if his tail have twisted the other way, or his miserable body acquired some new peculiarity, he is entered for the next heat under a new name, and away he goes again.

He appears in so many forms, and always so ready for mischief, that we must conclude that he is the devil's imp who was pictured in lurid colors by old theologians whose eyes of faith were equal to modern microscopes. Does the microbe continue steadily wrestling through the long years with the cell, until, at some opportune moment when the cell is moistening its hands for a fresh grip, or is gasping for its second wind, it grabs it by the throat and kills it outright, or keeps it alive to build up strange growths and pervert its brother cells? Then there is the microbe by whosé aid we digest our food, recently discovered by a European microscopist. We pride ourselves on being the monarchs of creation, yet either the microbe, which fits our doughnuts and beans for the proper sustaining of life is superior to us in being able to digest food without help, or it has a smaller one employed in that benevolent office. And where will it end? Is this microbe capable of improvement, mentally and physically, like the rest of animal creation, so that we may hope that our descendants, in Mr. Bellamy's era, will be the habitations of forms that will abolish dyspepsia by grappling successfully with the restaurant steak and pie? If so, then the bad microbe will also improve and the future still is dark. Will the time come when we shall have to rear them and care for them, as the fancier does for his poultry, and guests will expect, in lieu of the harmful cocktail so destructive to delicate organisms, a premensal potion of our own private brand of digestive microbes? May

we hope that the bad microbes will develop a moral nature which will prevent their taking advantage of every weak spot in the frames of our descendants? Are the bad ones retrograde forms from ancient simian or piscine (to go no farther back) contemporaries of man's progenitors, which were worsted then in the struggle for advancement and have since lived only for revenge? If the latter, then, according to what seems to be nature's plan, perhaps we may hope that they will continue to retrograde until they become impotent for evil, and leave us eventually to work out our own problems of existence in our own way. By scientists generally the theory of evolution has been accepted, and they recognize as potent factors the transmission of physical variations and of habits. No doubt every physician has seen families in which one of the parents died of "consumption" after children had been born; these children were stout and hearty during early years, but at puberty or soon after they died of phthisis in some form, or the disease did not appear until later, about the age at which the parent developed it; in other cases the male children only, or the female only, developed the disease. And so with cancer. We often see the children of parents (of whom one or both is scrofulous) flourish mentally and physically to the age of puberty, then, for several years they have a struggle to live, then a long life of fair health and vigor.

Now did they not inherit a cell motion or habit which stopped, or followed its acquired path, after a certain lapse of time? The parents at a certain age by reason of lack of adaptability, or of force to overcome competition, failed in the struggle of life and nature developed a plan for the extinction of the type. Accidental causes may precipitate the change in the offspring by lowering the vitality; marriage with a similar type may intensify the tendency in the offspring to extinction or retrogression.

We see everywhere in nature the repetition of ancestral forms; we recognize the force of habit and its transmission (as, for a familiar instance, in the setter dog), but we also see that the surroundings (meaning all influencing circumstances) may exaggerate or diminish the reproduction of ancestral peculiarities. The natural tendency, as a whole, seems to be toward healthy growth and higher type. The weakly are

crowded out in the race for life, and hence their peculiarities are not so likely to be handed down. By careful selection vegetation can be so modified that its usefulness to man will constantly increase. The vine and tree can be made to bloom earlier, to bear larger and more delicious fruit. With animal life it is the same. This is in line with the unaided efforts of nature which constantly labors to give the best results possible with the environment. Man can accelerate the change by lessening the competition and turning all forces more or less completely to the attainment of a certain result, so that in a few generations the connection between the remote ancestor and the present descendant can only be recognized by a study or picture of the gradations. There seems to be no reason why the human family, by careful and remorseless selection, cannot be changed and improved, just as we change and improve our domestic animals ; in fact, the change for the better is going on, but not by deliberate action. Habits of good or evil can be formed and transmitted. The children of tramps are likely to be tramps. But the children of a tramp by a person of different habits are not so likely to follow the footsteps of the tramp parent. There is a tendency to the transmission of physical peculiarities, and these are likely to be in the offspring, if useful, better adapted to their purpose, if useless, less pronounced.

No one denies that there are certain diseases which appear undoubtedly to be caused by micro-organisms ; with those I am not dealing. But is it not possible that the diseases which are generally known as hereditary, or which are characterized by perversions of cell-growth or function, are the results of a habit to reproduce the particular state, in these respects, of the parent organism at the time of the formation of the sperm or ovum cell? In other words, a man may have "consumption," accidentally developed in himself, and the sperm cell formed at that time may transmit the tendency to take on that particular form of perverted action, after the organism has passed, more or less completely, through the various stages of growth in the offspring (subject to the environment and transmitted tendencies of the other parent) that had been passed through in the diseased parent. An organism goes through all the stages from infancy to full growth,

each year bringing in its turn the peculiar manifestations of that stage of growth. By no delicacy of manipulation or power of lens can there be found in the sperm cell or ovum the various tissues which make the perfect frame, yet the union of the two cells causes each tissue in its turn to appear, and the transmitted peculiarities of the parent forms are faithfully reproduced. So, I repeat, may not these cells, sperm and ovum, have some inherent force which, after a certain lapse of time, or at a certain stage of growth, following always the paths formed in the parent organism, will lead the cells of a whole or part to take on the same perverted motion or function as that found or originated in the ancestor?

A child, for example, does not inherit syphilis; but the formative principle which causes the germ cells from its parent to build a being like the parent, has had stamped into it, incorporated with it, a disposition to carry out those processes set up in the parent which are characterized by perversions of structure and function; this struggles with the opposing disposition to follow the healthy and usual, or normal line of action, and, according to its virulency, or the energy of its initial motion, succeeds more or less completely. The offspring marries a healthy mate, and the disposition to perverted motion and action is less active in their offspring; but he marries an unhealthy mate, the disposition to perversion is intensified. If by any means this disposition to perversion be continued for a few generations it becomes a habit, and age is now an element in determining the date of explosion. Sometimes the disposition to healthy action is so strengthened by environment, marriage, etc., that a generation manifests only slightly, if at all, a diseased disposition, but if in the next circumstances favor, the habit will reappear (atavism). Science by change, by placing easily assimilable and plentiful nourishment at hand, gives the cells all of their powers to struggle to return to healthy action, until they have overcome the tendency to, and passed the period of retrograde and perverted motion and function. May not micro-organisms, in these diseases, simply occupy the position of parasites and scavengers, which throng to the diseased parts, and by their active presence and multiplication tend to increase the weakness and to spread the disease to adjacent parts? They cause, by the irritation of their presence, irritative fever, and so forth.

THE RELATION OF BACTERIA TO DISEASE.

THE varied connections and interdependence which pervade the great body of organic nature, from the lowest to the highest forms of living structure, together with the products generated by vegetable or animal organisms ; the necessary presence of inorganic combinations to the form, growth, and function of organized bodies ; the solidity of nature, if we may be permitted such an expression, must inevitably engage the attention of the thoughtful physician. The homologies of vertebrate animals invite his study ; the cellular structure and community of chemical composition of both plants and animals cannot fail to enlarge his conceptions of the majesty of physical nature. Vegetable morphology and vegetable physiology are perceived to stand in relation to the comparative anatomy and physiology of animals. Vessels, the circulation of nutrient fluids, the interchange of gases, the selection, accumulation, and transformation of pabulum, suggest that the same physical laws, no less than the same chemical elements and chemical laws, account for the varied phenomena of both kingdoms of animated nature. Physics, chemistry, and biology are indissolubly linked together ; pathology is but physiology modified by altered conditions of nutrition. The principles of classification are essentially the same in all the physical sciences. Abnormal developments of structure are referred to abnormal conditions of embryonic growth. Organs rudimentary in lower forms assume physiological importance and proportional increase or complexity of form in the higher. The human embryo passes through phases of development recalling structural forms which remain fixed in some of the lower tribes.

Such are the relations which connect different branches of biology with each other and with the inorganic world. It is not, therefore, surprising that the list of physicists, chemists, and naturalists should be graced by the names of so many men who have received a more or less complete medical training, and who have chosen to devote their energies principally to the cultivation of pure science. Julius Robert Mayer, Thomas Huxley, Richard Owen, John Hunter, James Cowles Prichard, Robert Brown, Linnæus, Galileo, and Copernicus, are among

the names which present themselves to the memory. From a strictly scientific point of view the study of the human body in health and disease may not unjustly be regarded as a department of natural history.

A happy recognition of the scientific connections of medicine is expressed in the title of the celebrated Congress of German Naturalists and Physicians. The sixty-second annual gathering of this body of learned men was held in Heidelberg from the 18th to the 23d of September, 1889. The text of the discourse, delivered by Professor Ludwig Brieger, of Berlin, now lies before us,* and is an able statement of the results of studies which the speaker has done so much to forward. The analogy between fermentation, putrefaction, and infection —nay, between fermentation and the digestive processes, which lie at the foundation of normal nutrition—becomes more and more forcible the more closely the phenomena of infection are investigated. As specific microbes induce those decompositions and rearrangements which result in the formation of alcohol, acetic, lactic, or butyric acid, the various changes which attend the decomposition of urine, so, it has been discovered, does the location and growth of pathogenic germs in animal tissues incite a series of chemical changes in those tissues. For it is not the mere dissemination or accumulation of bacteria within the body, not even the abstraction of oxygen and albumen from the tissues by which they are surrounded, that explains the power of these germs to produce disease. But when conditions are favorable to their growth, they must derive their nutritive material from the tissues. Decomposition and recombination occur in the soil in which they fix themselves, while the development and multiplication of the microbes is attended by the formation of specific chemical compounds. A process of change and interchange takes place. The bacteria abstract elements from the tissues make use of them in the process of their own nutrition, while they throw off certain compounds which accumulate in the part or are swept into the circulation. These definite chemical com-

* Bakterien und Krankheitsgifte. Vortrag, gehalken in der dritten allgemeinen Sitzung der 62 Versammlung deutscher Naturforscher und Aerzte am 23 September, 1889. Von Professor Ludwig Brieger (*Wiener Medical Blatter*, October 3d, 1889).

pounds, due to the life and growth of micro-organisms, are the specific causes of disease. Thus, to use the words of Professor Brieger, "the chemistry of bacteria stands in the most intimate relation to the clinical comprehension of the diseases which they originate." Many deleterious substances are produced in the course of digestion, but they enter into harmless combination with sulphuric acid and glycinic acid, which is a derivative of sugar. If this protective arrangement be destroyed, owing to a reduction of vital force, the result appears in the form of intestinal disorders, suppuration, diphtheria, erysipelas, and other maladies.

Of far higher clinical importance than these digestive products, belonging to the aromatic series, are the basic substances due to tissue changes induced by bacteria. These are not only harmful, but absolutely destructive to vital functions. Professor Brieger has denominated the markedly poisonous bases "toxines." The harmless bases, on the other hand, he calls "ptomaines," in honor of Selmi, who was the first to draw attention to the presence of substances resembling alkaloids in the animal body, though he was never able to isolate them in pure form.

Toxines are encountered during the process of primary digestion, during which albumens are being transformed into soluble peptones. The injection of peptones beneath the skin of animals has produced grave symptoms of intoxication. From fibrin, digested by means of pepsin, is derived a poison called pepto-toxin, which causes paralysis of the hinder extremities in animals and speedy death. In the putrefaction of animal flesh we meet with neuridin, cadaverin, putrescin, mydatoxin, neurin, methylguanidin, and a toxin isomeric with typho-toxin. Neurin is derived from cholin, which is a mildly poisonous component of lecithin. By bacterial agency a molecule of water is abstracted from cholin, and this simple manipulin converts cholin, which is only active in large quantities, into neurin, a deadly poison, which occasions total paralysis and arrest of the heart in diastole. Methylguanidin excites severe convulsions. The genesis of this compound illustrates the oxidizing power of bacteria. It is formed from creatin, an innocent constituent of the flesh of mammalia. From the decomposition of fish result a number of toxines,

among them one closely related to the fly fungus. The presence of these substances explains the severe gastric and nervous disturbances which may result from feeding on tainted flesh.

The staphylococcus pyogenes aureus of Rosenbach generates in animal broth, in addition to a ptomain but little studied as yet, a considerable quantity of ammonia. The streptococcus pyogenes of the same observer produces in the same culture material a large quantity of trimethylamin. From cultures of thy typhus bacillus there has been obtained a specific toxine, known as typho-toxine. This, injected into guinea-pigs, abolishes control over the voluntary muscles and promotes increased salivary and intestinal secretion. The chemical power of Koch's cholera bacillus gives rise to penta- and tetramethylendiamin, methylguanidin, etc. Four poisons have been isolated whose action is to cause convulsions. One of these excites, also, a rapid flow of tears and saliva, symptoms which are sometimes met with in traumatic tetanus. A substance to which the name tetanin has been given has been found in the amputated arm of a patient who died of tetanus. Baumann and v. Udránszky have detected in the dejections of a man who suffered from the excretion of cystine ptomaines belonging to the group of diamines. Stadthagen and Brieger have made a similar discovery, which would seem to indicate that cystinuria, hitherto looked upon as the result of obscure tissue changes, should be regarded as an intestinal mycosis.

The list of ptomaines and toxines at present embraces more than forty substances. Of this number about thirty were discovered by Professor Brieger.

Gautier has described a class of substances which he terms leucomaines, as being engendered in the normal metabolism of tissue, and these bodies may contribute toward that autointoxication which Bouchard describes. Nevertheless, Brieger declares that he has been unable, spite of earnest endeavor, to obtain the leucomaines. He has, however, upon several occasions, detected in human brain-tissue both neuridin and neurin, the latter an energetic poison. Doubtless many disorders are produced by the products of cell life. The substance discovered by Kossel, and called adenin, from its presence in glandular tissue, has been observed in considerable

quantity in the blood of leukæmic patients, though not present in normal blood.

In addition to their inherent importance in explaining the genesis of disease, these chemical results of bacterial activity, these ptomaines and toxines, possess immediate practical importance from the point of view of preventive medicine. Analogical reasoning suggests that incorporation of these chemical substances of specific toxicity by a process of "vaccination" may become available as prophylaxis.—*Medical Bulletin.*

DISPOSAL OF HOUSE-REFUSE.

READ IN THE SECTION OF STATE MEDICINE AT THE FORTIETH ANNUAL MEETING OF THE AMERICAN MEDICAL ASSOCIATION, JUNE, 1889.

By Alfred Ludlow Carroll, M.D., of New York.

Household life necessitates the deportation of several different kinds of refuse matter, consisting of excremental substances, liquid wastes from the kitchen and the laundry, baths and basins, garbage, sweepings and dust of various sorts. As regards the first of these, the average for each individual is 57 pounds of fæcal excreta and 114 gallons of urine annually; or, for a family of five persons, 285 pounds and 570 gallons respectively. The danger from these is not when they are freshly voided, but after decomposition has set in, favoring the evolution of noxious gases and volatile products of putrefaction. Where atmospheric oxygen has free access, the principal results of decomposition are ammonia, carbonic acid, and water; but in large accumulations, where air cannot thoroughly penetrate, deleterious compounds are generated, bacterial ferments multiply, and ptomainal products are given off in increased quantity. An additional peril arises where the intestinal discharges are impregnated with the virus of specific diseases, such as cholera, enteric-fever, and probably other diarrhœal maladies, though even in this case it seems to be requisite for the development of the contagium that decomposition shall have reached a certain stage. When urine is mixed with fæces, fermentation occurs more rapidly and

with greater evolution of volatilized organic products. For these reasons it is of prime importance that such matters be removed from any possibility of communication with the interior of the house, or of its inmates, before they shall have time to decompose—that is to say, for practical purposes, within twelve hours.

But a grievous mistake, made by many engineers and by some superficial writers on hygiene, is to consider the intestinal and renal dejecta as the only things to be cared for, whereas in reality they constitute less than one per cent of the offensive residua which should be speedily removed from inhabited places. The feathery masses of decaying epithelium from basins and baths, or the organic scourings from soiled clothing, not only afford fertile culture media for microzymes, but are often specifically infected ; the culinary outpourings are virtually weak organic broths, responding readily to inoculation ; indeed, all the water supplied to the domicile is discharged in so fouled a condition that prudence forbids its retention on or about the premises. There is little difference in the sewage of towns whether excremental matter be admitted or excluded, and in populous communities where "dry methods" are used, it is found necessary to construct sewers in addition. Liernur's pneumatic system and other schemes based upon the single view of the manurial utility of undiluted excreta are open to the same objection.

If the arch-enemy of mankind had been asked to suggest the most mischievous method of dealing with these waste products, he could not have devised a more diabolical one than that which is commonly adopted, not alone in sequestered rural regions, but in the majority of villages, and which lingers as a relic of barbarism even in many cities, to wit : the storage of them in pervious privy-pits and cesspools, whence the festering liquefied filth permeates the soil over a wide area, polluting the surface wells which are usually in convenient proximity, and poisoning with its noxious exhalations the ground atmosphere which is drawn into the basements of ill-constructed houses.

Of the various plans for the "dry disposal" of excreta, the simplest is admixture with dry earth or sifted coal-ashes, using either a shallow cemented pit, a box, or other receptacle

above ground, or one of the more elaborate patterns of earth-closets. While this may be practicable for single houses or for very small hamlets, the difficulty of carrying it out on a larger scale is almost insurmountable. It is estimated that for a population of 10,000 more than a hundred tons of dry earth would be required weekly, and the supply and removal of such a quantity would involve expensive machinery. It is an error to suppose that the fertilizing quality of this earth after use will compensate for its transportation. Even when it has been redried and used several times it is no richer than ordinary garden soil, and is absolutely worthless as manure. In many places abroad the tub or pail system is employed with more or less satisfactory results, movable vessels receiving the excreta with or without the admixture of ashes, chaff, or other absorbent or deodorizing substances, and being removed once a week or oftener by the public authorities, the more voluminous remainder of the sewage being reserved for irrigation or "intermittent filtration."

In rural or suburban districts, where there is a reasonable amount of ground about the house, with grass or a small garden plot, liquid wastes may safely be distributed on the surface; not poured persistently in the same spot, after the manner of the average handmaiden, to create an artificial swamp close to the foundation walls, but scattered thinly and alternately over a wider extent of growing vegetation. A piece of land 20 x 25 feet will amply suffice to utilize all the "slops" of an ordinary household, if due regard be paid to their distribution, avoiding, of course, the vicinity of the well, if the water-supply be derived from this source. A neater but costlier plan is "subsoil irrigation" through a branching system of loose-jointed small drain-pipes, laid about a foot below the surface of the ground, so as to distribute their contents within reach of the roots of plants. To render this method effective it is almost essential to collect the sewage in a tank with an automatic mechanism for discharging at stated intervals, since a continual trickling would fail to flow to the terminal branches, and without preliminary subsidence the suspended solids would be apt to clog the pipes in a sluggish current. Too great a descent, on the other hand, will carry all the discharge at once to the farther end of the drains, thus

thwarting the purpose of uniform distribution. The proper grade for pipes in this system, according to Colonel Waring, who is one of its strongest advocates, is not more than 6 inches in each 100 feet. Beyond the æsthetic consideration of putting things out of sight, this subsoil system has no special advantage over surface irrigation ; indeed, where large quantities of sewage are to be dealt with the latter is preferable, if it be intermittent. For both methods perviousness of the soil is a pre-requisite, and a clayey or other moisture-retaining ground should first be thoroughly underdrained ; for it is to be remembered that the purifying power of "dry earth" resides not in the earth itself, but in the air contained in its interstices. It is an accepted belief that the bacilli of "nitrification" have their usual field of action in the uppermost two or three feet of a fairly pervious soil, while at a greater depth those which preside over mischievous putrefactive processes predominate. This limitation, however, cannot be arbitrarily fixed, since it depends upon the depth to which the soil is aerated, and in a water-logged earth it may be confined to a few superficial inches. In properly selected or prepared ground the water of sewage (if not too profusely applied) filters downward, leaving its suspended and most of its dissolved matters to the ventilated laboratory above.

A desire for all attainable "modern improvements," conjoined with the imperative demand of the imported domestic vicegerent for "hot-and-cowld-wather-and-stationary-tubs," has brought into general vogue, even in rural abodes, water-closets, kitchen sinks, fixed hand-basins, and the rest of the complicated paraphernalia of the "water carriage" system, which is a very good system, if the plumbing arrangements be intelligently planned and well constructed, if there be a sufficient water-supply to flush and thoroughly cleanse all waste-pipes, and if a safe outfall be provided, but which, if made to discharge into a leaching cesspool or to pollute the nearest stream, to the detriment of riparian residents below, is anything but an unalloyed blessing. If a cesspool be permitted in connection with such a system, it should be of small capacity, absolutely water-tight, ventilated by means of an air-pipe reaching above the level of respiration, and emptied frequently. Its liquid contents, which comprise about seven eighths of the fertilizing materials, may be utilized in a garden by

either surface or subsoil irrigation, and the precipitated solids deodorized with lime, copperas, or other agents, for deportation to such destination as chance or the public authorities may afford. On a scale of more expensive magnitude, where arable or pasture land of suitable quality is at hand, a well-masoned "settling basin," with an overflow into a distributing tank, answers satisfactorily. In communities with a public system of sewerage the final disposition of the sewage does not concern the householder as an individual, though it should interest him more than it usually does in his collective capacity.

The grosser refuse solids which go under the generic name of "garbage" constitute the bane of social existence, from the domestic "swill-pail" to the "dumps" of large communities. Even where the corporate authorities assume the duty of gathering them from the separate premises they are usually deposited in an aggregate of nastiness at some convenient spot on the outskirts, whence their exhalations vitiate the atmosphere for miles around, or, mixed with mineral rubbish of different kinds, are used by some contractor to fill in prospective building sites, for the gradual murder of future tenants. The common rustic makeshift of burying them in casual shallow pits handily contiguous to the domicile must in time overtax the disinfectant capacity of any soil, and is, as a rule, rather less advisable than the prevalent urban practice of throwing them into a neighbor's gutter or over the roadway. The best way to get rid of such things is, unquestionably, to burn them. Cremation is the manifest destiny of organic matter in all populated places. It means a rapid and innocuous, instead of a slow and possibly dangerous, process of oxidation. In either case organic substances are never destroyed, but their chemical compositions are changed and their elements are profitably recombined in nature's laboratory. In the most humble household the incineration of vegetable matters may be easily effected in a cooking-stove or range, if they be put in a little at a time. An ingenious metallic pail with a water-sealed cover and a hinged grated bottom has been anonymously invented by a member of this Association, in which, when placed over one of the openings of a range, a considerable quantity of garbage can be inodorously dried to the point of combustibility and dropped into the fire. On a larger scale furnaces of different capacities are in common use

abroad and to a less extent here which cremate, without offense and at small expense, all private and public refuse, including slaughter-house offal, street sweepings, etc., from small villages up to great cities. One of the first of these, I believe, in this country has been for some time in successful operation on Governor's Island, in New York harbor, where the orderly in charge informed me that the only element of the garrison jetsam which was passingly malodorous was an occasional burnt-offering of old shoes. In some instances the mineral detritus, which forms a large percentage of city refuse, after being thus freed from organic admixture, is converted into a serviceable cement, as is notably the case in Leeds, where the outlay for maintaining the "destructor" is much lessened by the sale of the resulting product. But, aside from any actual pecuniary return, the economy of this plan of combustion, as compared with other methods of disposal, should commend it to every corporate government. In the notorious Whitechapel district of London, where it formerly cost from half a dollar to a dollar a load to cart away to a distance the household refuse and "dust," all the contents of the East End bins are reduced to a harmless mass of clinker at about one twelfth of the expense by means of a series of strong draught furnaces, which consume all gases generated during the process. The day is probably not far distant when this method of purification by fire will be adopted for organic waste substances wherever civilized men dwell together. Meanwhile, it is the part of wisdom to prevent their accumulation either above or under ground.

If an apology be due for this brief presentation of rudimentary considerations before an assemblage principally composed of experts, my excuse must be a desire to remind a wider audience, through the publicity given to our proceedings, that the "dry methods," exclusively advocated by a few doctrinaires, are applicable to a very small part of our deleterious wastes; that sewage farming and other schemes for irrigation and filtration involve separate treatment of precipitated solids; that the best devised system of sewerage still leaves on our hands an enormous residuum which must be otherwise dealt with; and that no one method of refuse-disposal will satisfy the diverse needs of households and communities.—*Journal of American Medical Association.*

EDITOR'S TABLE.

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A SANITARY WASH-HOUSE.

ONE of the many excellent papers in the March *Century* is on "Glasgow: A Municipal Study," by Albert Shaw, from which we quote as follows:

"Not the least important feature of the health department's work in Glasgow is the Sanitary Wash-house. A similar establishment should be a part of the municipal economy of every large town. In 1864 the authorities found it necessary to superintend the disinfection of dwellings, and a small temporary wash-house was opened, with a few tubs for the cleansing of apparel, etc., removed from infected houses. For a time after the acquisition of Belvidere a part of the laundry of the hospital was used for the purpose of a general sanitary wash-house. But larger quarters being needed, a separate establishment was built and opened in 1883, its cost being about $50,000. This place is so admirable in its system and its mechanical appointments that I am again tempted to digress with a technical description. The place is in constant communication with sanitary headquarters, and its collecting wagons are on the road early every morning. The larger part of the articles removed for disinfection and cleansing must be returned on the same day, to meet the necessities of poor families. I visited the house on a day when 1800 pieces, from 25 different families, had come in. In 1887, 6700 washings, aggregating 380,000 pieces, were done. The quantity, of course, varies from year to year with the amount of infectious disease in the city. The establishment has a crematory, to which all household articles whatsoever that are to be burned after a case of infectious disease must be brought by the vans of the sanitary department. The carpet-cleaning machinery and the arrangements for disinfection by steam, by chemicals, and by boiling I cannot here describe.

"The department's disinfecting and whitewashing staff is operated from the wash-house as headquarters. A patient being removed to the hospital, the authorities at once take possession of the house for cleansing and disinfection. It is a point of interest also that the city has provided a comfortable 'house of reception' of some ten rooms, with two or three permanent servants, where families may be entertained for a day or more as the city's guests, if it is desirable to remove them from their homes during the progress of the disinfecting and clothes-washing operations. The house is kept in constant use, and it is found a very convenient thing for the department to have at its disposal.

"As net results of the sanitary work of the Glasgow authorities may be mentioned the almost entire extinction of some of the worst forms of contagious disease, and a mastery of the situation which leaves comparatively little fear of widespread epidemics in the future, in spite of the fact that Glasgow is a great seaport, has an unfavorable climate, and has an extraordinarily dense and badly-housed working population. The steady decline of the total death-rate, and its remarkably rapid decline as regards those diseases at which sanitary science more especially aims its weapons, are achievements which are a proper source of gratification to the town council and the officers of the health department."

CONSUMPTION CONTAGIUM: where does it reside? There is but one answer—*in the sputum.* Its danger is so great that even to the extent of a one one-hundredth thousandth dilution it is infectious. Hence all our efforts against the spread of consumption should be directed against the dissemination of the sputa of consumptives. And for this it suffices that persons afflicted with consumption should not spit upon the floor or roundabout or into their handkerchiefs, but instead, into small cups adapted to the purpose containing a little water. The contents of such cups should be emptied into fire, and the cups frequently rinsed with boiling water, or, if made of paper, burned up with their contents.

TUBERCULOSIS FROM CIGARS.—It is stated by the *Canada Lancet*, January, 1890, that a German physician, on examina-

tion of a number of cigar tips, found that many of them were infected with tubercle bacilli. The makers were tuberculous, and in the manufacture of the cigars moistened the tips with their saliva.

ASEPSIS IN THE SICK CHAMBER.—M. Sevestre disinfects the sick chamber with the following liquid used in a vaporizer: Acid thymic, 5 grms.; acid carbol., 10 grms.; alcohol, 100 grms.; aqu., 885 grms.—*Journal de Médecine.*

Listerine is doubtless at least equally as good, and, indeed, probably has no superior as an agreeable as well as efficient antiseptic, so far as efficiency by any means may be practicable for the sick chamber. It consists of the essential ethers and oils of thyme, eucalyptus, baptisia gaultheria, and mentha arvensis in combination with benzo-boracic acid.

The vapor evolved by its use in the sick room, by means of spray or saturated cloths, hung about, is actively ozonifying and rapidly oxidizing in its effects on organic matter afloat in the chamber, while at the same time it imparts an agreeable odor to the atmosphere.

SWEAT-BANDS OF HATS may contain even twenty-eight per cent of fatty acids, which in summer may penetrate into the forehead and cause inflammation and corrode deeply into the skin. Rub with burnt magnesia every little while, so as to leave a small film on the band; wipe it off with a cloth before applying again.—*Prager med. Wochenschrift*, 39, 1889.

[But a *felt* sweat-band which contains no fatty acids is much more comfortable at all times, and is not liable to cause inflammation or any irritation of the skin whatever.—EDITOR.]

"REMOVAL OF MANURE," referred to as one of the reports of the Committee on Hygiene of the Medical Society of the county of New York, in the report of the State Society's Committee, on another page, simply consists of a reference to the co-operative work of the county society with the Ladies' Health Protective Association to aid them in pressing before the City Board of Health the desirability of compelling keepers of stables to compress their manure and to remove it in that form from the stables.

The co-operation of the Section in Public Health of the Academy of Medicine was also secured, and the result was comprised in the resolution adopted and published in our January number, recommending an amendment to the Sanitary Code of the Health Department to effect the purpose desired by the Ladies' Association.

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

ALABAMA.—*Mobile*, 40,000 : Reports 49 deaths during January, of which 17 were under five years of age. Annual death-rate, 14.7 per 1000. From zymotic diseases, 9, and from consumption, 7.

CALIFORNIA.—For the month of January, 1890, the Secretary's abstract of the reports received from 94 cities and towns, with an aggregate population of 801,700, the number of deaths was 1385. Annual death-rate, 20.64. Deaths from consumption during the month, 270. From zymotic diseases : Diphtheria and croup, 40 ; typhoid-fever, 28 ; typho-malarial-fever, 2 ; cerebro-spinal-fever, 11 ; diarrhœal diseases, 14 ; whooping-cough, 1 ; scarlatina, 7.

CONNECTICUT.—For the month of January, 165 towns, with an aggregate population of 754,172, report 1648 deaths, 227 being under five years of age. Annual death-rate, 26.2 per 1000. Deaths from zymotic diseases numbered 163, and from consumption, 199.

DISTRICT OF COLUMBIA.—Total deaths during three weeks ending January 25th, 443, of which 145 were under five years of age. There were 216 deaths in the colored population. Annual death-rate, 30.7. Zymotic diseases caused 48 deaths, and consumption, 56.

IOWA.—The State Board *Bulletin* for February publishes entire Rev. Charles R. Treat's paper on "Sanitary Entombment," from THE SANITARIAN for December, without credit.

Diseases reported for the month of January : Diphtheria in twelve localities ; scarlet-fever in six localities.

The reports for the month are indicative of subsidence of contagious diseases in the State.

Des Moines.—58,000 : During the month of January, deaths, 49 ; from diphtheria, 10.

Dubuque.—35,000 : Deaths, 50.

Keokuk.—16,000 : Deaths, 23.

LOUISIANA.—*New Orleans*, 254,000 : During the four weeks ending January 25th there were 480 deaths, of which 138 were under five years of age. There were 187 deaths in the colored population. Annual death-rate per 1000, 24.65. From zymotic diseases there were 93 deaths, and from consumption, 56.

MARYLAND.—*Baltimore*, 500,343 : During the four weeks ending January 25th, there were 930 deaths, of which 295 were under five years of age. Annual death-rate, 24.17 per 1000. There were 101 deaths from zymotic diseases, and 135 from consumption.

MASSACHUSETTS.—*Boston*, 420,000 : Reports for January 1309 deaths, of which number 268 were under five years of age. Annual death-rate, 37.4 per 1000. From zymotic diseases there were 136 deaths, and from consumption, 213.

MICHIGAN.—For the month of January, 1890, compared with the preceding month, the reports indicate that influenza, pneumonia, pleuritis, and membranous croup increased, and that typho-malarial-fever, inflammation of brain, cholera morbus, typhoid-fever (enteric), dysentery, inflammation of kidney, inflammation of bowels, whooping-cough, diphtheria, and small-pox decreased in prevalence.

Compared with the average for the month of January in the four years 1886–89, influenza, pneumonia, and measles were more prevalent, and typho-malarial-fever, cholera morbus, cholera infantum, dysentery, inflammation of brain, membranous croup, typhoid-fever, scarlet-fever, cerebro-spinal meningitis, diphtheria, and remittent-fever were less prevalent in January, 1890.

Including reports by regular observers and others, diphtheria

was reported present in Michigan in the month of January, 1890, at sixty-one places, scarlet-fever at sixty-two places, typhoid-fever at forty-eight places, and measles at twenty-seven places.

Reports from all sources show diphtheria reported at four places more, scarlet-fever at two places less, typhoid-fever at nine places less, and measles at five places more in the month of January, 1890, than in the preceding month.

Detroit, 250,000 : Reports for the month of January 406 deaths, of which 81 were under five years of age. Annual death-rate, 19.12 per 1000. From zymotic diseases there were 64 deaths ; from consumption, 38.

MINNESOTA.—*Bulletin* reports for the month of January, 1890, up to February 20th : Population in cities over 2000 inhabitants, 539,900 ; towns and villages, 1,047,860.

Total number of deaths, 1169, against 956 previous month ; 42.7 per cent occurred in towns, 57.3 per cent occurred in cities over 2000 population.

Diphtheria, 56 deaths in twenty-seven localities ; scarlet-fever, 21 deaths in eight localities ; croup, 17 deaths in twelve localities ; typhoid-fever, 35 deaths in seventeen localities ; pneumonia, 178 deaths in seventy-six localities ; bronchitis, 42 deaths in eleven localities ; influenza, 70 deaths—73 per cent in townships, 27 per cent in cities.

St. Paul, 180,000 : Reports for January 173 deaths, of which 62 were under five years of age. Annual death-rate, 9.61 per 1000. From zymotic diseases, 26, and from consumption, 11.

MISSOURI.—*St. Louis*, 450,000 : Reports for January 734 deaths, of which number 212 were under five years of age. Annual rate of mortality, 19.57 per 1000. From zymotic diseases there were 107 deaths, and from consumption, 90.

NEW JERSEY.—*Paterson*, 85,000 : Reports 177 deaths during January, of which number 48 were under five years of age. Annual death-rate, 24.5 per 1000. There were 20 deaths from zymotic diseases, and 23 from consumption.

Hudson County, 292,734 : Reports 889 deaths during January, of which number 285 were under five years of age. An-

nual death-rate, 36.4 per 1000. There were 129 deaths from zymotic diseases, and 106 from consumption.

NEW YORK.—*The Ninth Annual Report of the State Board*, for the year 1888, a volume of six hundred and nine pages, with numerous plates and maps, is of much value by reason of the reports on the sanitary investigations, drainage and sewerage, and water-supplies of different localities, exposing many dangerous defects which ought to, as they doubtless will, go far toward rousing the people to a proper sense of their danger in tolerating the causes of diseases in their midst which they ought to prevent. Among them is the report on the Potable Water-Supply of the city of New York, issued separately some time ago, reviewed by Dr. Grimshaw in our preceding number. That report is a fair sample of the rest on the same subject, excepting its greater elaboration.

It is gratifying to notice the increasing concern of the people with regard to the importance of pure water-supply, drainage and sewerage, and their more frequent calls upon the State authorities for aid and advice in the abatement of nuisances. The chief evils they have to contend with are the result of encroachments by private corporations, whose soulness is proverbial. But public sentiment in this regard is keeping pace with sanitary knowledge, and proportionally as the State Board restricts its efforts to strengthening the local authorities in the use of their own resources, it will increase in strength *pari passu* with the sanitary knowledge of the people, and, it is to be hoped, will erelong see its way clear to initiate such measures as the law contemplates for the prevention of disease, without waiting for the reported results of neglected causes ; particularly with reference to institutions of all kinds which have or undertake the charge of considerable numbers of persons. Of the sanitary condition of the State generally, as indicated by a summary of the statistics of the monthly *Bulletin*, little need be said, inasmuch as the same statistics have been sent to and published in our pages monthly. After making due allowance for some eighty non-reporting towns comprising a population of 150,000, the death-rate of the State is estimated to be 19.64 per 1000 of population. Of the total number of deaths—104,450—38,345, or 36.5 per cent,

were of children under five years of age—7 per cent less than the average of the preceding four years.

23,647—219.80 in each 1000 deaths from all causes—were caused by zymotic diseases. The chief of these were :

Typhoid-fever, for the four years ending with the report before us, 5046—1.38 per cent of the total mortality for the period ; " for 1888 the rate was a trifle higher."

Scarlet-fever was more than usually fatal—2.28 in each 1000 deaths—1.03 more than the average in the three preceding years.

Diphtheria, excepting diarrhœal, continues to be the most prevalent and fatal of the zymotic diseases, though a little reduced from the preceding year. From it the number of deaths was 6448 (without including delayed returns of not less than 300 more), or 29.30 per cent from all causes.

The report on Adulterated Food and Drugs was reviewed in our November issue.

For the month of January, 1890, the Secretary reports that the mortality was over 60 per cent, or nearly 5000 greater than the average during the past five years in this month. It is greater by 2000 than that of July, the most fatal month in the year. The increase is not due to ordinary zymotic diseases, the actual number of deaths from which is 340 less than in January, 1889. The percentage of deaths under five years of age is also less by about one half than the average for January. The increase has been due to the remarkable occurrence of epidemic influenza, which began in December. Only a few hundred deaths have been certified to from this cause directly. It has shown itself in a large mortality from all local diseases. The number of deaths from acute respiratory diseases is about three times greater than the average in January, and from diseases of the nervous, circulatory, and digestive systems there is an increase of from 37 to 40 per cent. Consumption shows an increase of 70 per cent, deaths from old age are increased, and from unclassified causes they are nearly doubled. The death-rate from the preventable diseases is unusually low, and the mortality record for the month would have been less than the average but for the advent of this uncontrollable epidemic, which has added not less than 4000 to the mortality for the month.

New York, 1,622,000 : Total deaths, 4745—27.2 per cent under five years. Annual death-rate, 34.44. From zymotic diseases there were 402 deaths, and from consumption, 797.

Brooklyn, 852,467 : Total deaths, 2151—27.2 per cent under five years. Annual death-rate, 29.72. From zymotic diseases there were 204 deaths, and from consumption, 283.

Buffalo, 230,000 : Total deaths, 389—28.4 per cent under five years. Annual death-rate, 21.96. From zymotic diseases there were 44 deaths, and from consumption, 49.

Rochester, 130,000 : Total deaths, 237—19.4 per cent under five years. Annual death-rate, 21.72. From zymotic diseases there were 13 deaths, and from consumption, 33.

Albany, 103,000 : Total deaths, 353—21 per cent under five years. Annual death-rate, 41.12. From zymotic diseases there were 42 deaths, and from consumption, 49.

Syracuse, 87,000 : Total deaths, 186—17.7 per cent under five years. Annual death-rate, 25.65. From zymotic diseases there were 18 deaths, and from consumption, 30.

OHIO.—*Cincinnati*, 325,000 : Reports for January 678 deaths, of which 204 were under five years of age. Annual death-rate, 25.03 per 1000. From zymotic diseases there were 121 deaths, and from consumption, 99.

PENNSYLVANIA.—*Philadelphia*, 1,064,277 : Reports for four weeks ending January 25th, 2539 deaths, of which 628 were under five years of age. Annual death-rate, 31.0 per 1000. From the principal zymotic diseases there were 237 deaths, and from consumption, 356.

Pittsburg, 230,000 : Reports for four weeks ending January 25th, 372 deaths, of which 126 were under five years of age. Annual death-rate, 20.1 per 1000. There were 54 deaths from zymotic diseases, and 37 from consumption.

RHODE ISLAND.—During the month of January there were 822 deaths in an estimated population of 314,810. Annual death-rate, 31.32 per 1000.

TENNESSEE.—The principal diseases, named in the order of their greater prevalence, in the State during January, were : Pneumonia, consumption, malarial-fever, bronchitis, rheumatism, and tonsilitis.

Chattanooga,	white,	11.55 ;	colored,	36.00 : 19.50
Clarksville,	"	9.60 ;	"	28.00 : 16.50
Knoxville,	"	11.73 ;	"	24.18 : 14.27
Nashville,	"	12.28 ;	"	25.33 : 17.16
Memphis,	"	23.90 ;	"	31.08 : 27.16

WISCONSIN.—*Milwaukee*, 210,000 : Reports 408 deaths in January, of which 91 were under five years of age. Annual death-rate, 23.3 per 1000. From zymotic diseases there were 57 deaths, and from consumption, 44.

POPULATIONS, NUMBER OF DEATHS AND DEATH-RATES IN FOREIGN CITIES FOR THE YEAR 1889.

London, 4,351,738, 75,689—17.4 ; Liverpool, 606,562, 13,046—21.5 ; Glasgow, 528,144, 13,064—24.7 ; Birmingham, 454,835, 8585—18.9 ; Manchester, 378,800, 10,091—26.7 ; Leeds, 357,449, 7888—22.1; Dublin, 353,082, 9039—25.6 ; Sheffield, 327,227, 6785—20.7 ; Edinburgh, 266,900, 4785—17.9 ; Bradford, 235,056, 4491—19.1 ; Belfast, 229,622, 5917—25.8 ; Bristol, 229,361, 4023—17.5 ; Hull, 208,017, 4099—19.7 ; Newcastle, 160,983, 4044—25.1 ; Brussels, 471,606, 9153—19.4 ; Amsterdam, 399,015, 8954—22.4 ; Rotterdam, 197,723, 4594—23.2 ; Hague, 153,440, 2974—19.4 ; Utrecht, 83,308, 1837—22.1 ; Groningen, 54,332, 1096—20.2 ; Maestricht, 31,880, 630—19.8 ; Paris, 2,260,945, 53,318—23.5 ; Lyons, 401,930, 8652—21.5 ; Marseilles, 376,143, 10,819—28.7 ; Nantes, 127,482, 2655—20.8 ; St. Etienne, 117,875, 2974—25.2 ; Le Havre, 112,074, 2967—26.5 ; Rouen, 106,496, 3262—30.6 ; Roubaix, 100,456, 2321—23.1 ; Rheims, 97,903, 2426—24.8 ; Nancy, 83,500, 1856—22.2 ; Amiens, 80,288, 1807—22.5 ; Nice, 78,482, 2178—27.8 ; Limoges, 68,497, 1524—22.2 ; Besançon, 56,511, 1231—21.8 ; St. Quentin, 46,746, 929—19.2 ; Berlin, 1,453,571, 34,046—23.4 ; Hamburg, 563,263, 13,488—23.9 ; Breslau, 313,451, 9212—29.4 ; Munich, 284,886, 8671—30.4 ; Dresden, 264,196, 5725—21.7 ; Leipzig, 213,240, 4430—20.8 ; Cologne, 273,500, 6155—22.5 ; Magdeburg, 175,563, 5003—28.5 ; Frankfort-on-the-Main, 167,194, 3354—20.1 ; Kœnigsberg, 158,489, 4457—28.1 ; Hanover, 151,836, 3133—20.6 ; Dusseldorf, 129,330, 3062—23.7 ; Nu-

remberg, 125,906, 3441—27.3 ; Bremen, 122,652, 2307—18.8 ; Chemnitz, 122,065, 3844—31.5 ; Stuttgart, 119,367, 2418—20.3 ; Dantzig, 119,288, 3214—27.0 ; Strasburg, 117,373, 2658—22.6 ; Altona, 114,514, 2676—23.4 ; Barmen, 108,174, 2196—20.3 ; Aix-la-Chapelle, 103,017, 2485—24.1 ; Bâle, 69,809, 1299—20.4 ; Geneva, 52,043, 960—18.4 ; Berne, 46,009, 942—20.5; Lausanne, 33,340, 605—18.1 ; Zurich, 27,644, 456—16.5 ; Chaux-de-Fonds, 25,603, 443—17.3 ; Vienna, 811,434, 19,795—24.4 ; Buda-Pesth, 452,907, 13,304—29.4 ; Prague, 304,356, 7330—24.1 ; Trieste, 158,084, 4015—26.0 ; Lemberg, 121,610, 3491—28.7 ; Gratz, 106,343, 2826—26.6 ; Cracovie, 75,223, 2269—30.2 ; Debreczin, 56,624, 1555—27.5 ; Presburg, 49,136, 1620—33.0 ; Copenhagen, 307,000, 6674—21.7 ; Stockholm, 221,549, 4546—20.5 ; Christiania, 138,300, 2978—21.5 ; Helsingfors, 53,813, 1252—23.3 ; St. Petersburg, 988,016, 27,674—28.0 ; Warsaw, 444,814, 13,070—29.4 ; Odessa, 272,000, 7081—26.0 ; Genoa, 186,858, 4497—29.4 ; Turin, 306,398, 6525—21.3 ; Bologne, 136,608, 3228—24.1 ; Venice, 153,375, 4533—29.0 ; Livourne, 102,893, 2233—21.6 ; Bucharest, 206,000, 5602—27.2 ; Jassy, 83,221, 2490—29.9.

Cholera in Mesopotamia is, for the present at least, practically extinct ; an occasional outbreak in other parts may or may not prolong the disease until the infection breaks out again next summer.

Dr. Gabuzzi, in his latest communication to the *Journal d'Hygiene*, January 9th, 1890, closes his correspondence relative to its progress, and states that "the origin, as well as the termination of the epidemic, remain unknown quantities." "This is also our conviction," remarks the *Journal*, "and our thanks and the acknowledgments of the Société Française d'Hygiene are tendered to our learned and faithful correspondent."

The latest notice by the Sanitary Administration of the Ottoman Empire, signed by the Inspector General, Dr. Cozzonis, announces that the quarantine restrictions against arrivals from Mesopotamia and the Persian Gulf, whether by sea, by land, or by river conveyance, have been removed ; but that those coming from Persia by land, by sea, or by river are subjected to a quarantine of five days for observation.—*T. P. C.*

MORTALITY FROM INFECTIOUS DISEASES IN FOREIGN CITIES FOR THE YEAR 1889.

Measles.—London, 2315; Liverpool, 485; Glasgow, 641; Birmingham, 196; Manchester, 525; Leeds, 335; Dublin, 112; Sheffield, 224; Hull, 200; Amsterdam, 316; Rotterdam, 173; Paris, 1213; Brussels, 110; Marseilles, 324; Berlin, 182; Munich, 201; Cologne, 199; Vienna, 357; St. Petersburg, 446; Warsaw, 240; Turin, 217.

Scarlet-fever.—London, 784; Liverpool, 352; Glasgow, 111; Birmingham, 153; Manchester, 174; Leeds, 119; Sheffield, 228; Paris, 178; Lyons, 24; Berlin, 221; Munich, 112; Kœnigsburg, 224; Dantzic, 106; Vienna, 135; Buda-Pesth, 119; Prague, 118; Stockholm, 120; St. Petersburg, 606; Warsaw, 261.

Diphtheria and Croup.—London, 2068; Glasgow, 316; Manchester, 153; Edinburgh, 181; Amsterdam, 272; Paris, 1695; Lyons, 225; Marseilles, 363; Berlin, 1243; Hamburg, 500; Breslau, 384; Munich, 411; Dresden, 282; Leipzig, 212; Magdeburg, 127; Frankfort, 225; Kœnigsburg, 208; Hanover, 244; Nuremburg, 142; Stuttgart, 125; Vienna, 508; Buda-Pesth, 636; Prague, 320; Copenhagen, 396; Stockholm, 153; Christiana, 343; St. Petersburg, 407; Warsaw, 439; Odessa, 139; Turin, 171.

Typhus and Typhoid Fevers.—London, 592; Liverpool, 211; Glasgow, 145; Birmingham, 42; Manchester, 98; Leeds, 128; Dublin, 250; Sheffield, 73; Edinburgh, 48; Belfast, 213; Amsterdam, 48; Brussels, 83; Paris, 988; Lyons, 110; Marseilles, 330; Nantes, 71; Havre, 92; Nice, 80; Berlin, 331; Hamburg, 233; Vienna, 104; Buda-Pesth, 389; Prague, 86; Copenhagen, 54; St. Petersburg, 840; Warsaw, 119; Genoa, 91; Turin, 90; Bucharest, 117.

Small-pox.—Paris, 127; Lyons, 68; Marseilles, 195; St. Etienne, 78; Havre, 57; Rouen, 17; Nancy, 17; Amiens, 103; Limoges, 6; Vienna, 13; Prague, 350; Trieste, 38; Lemburg, 59; Gratz, 7; St. Petersburg, 32; Warsaw, 760; Odessa, 35; Genoa, 29; Turin, 10; Bologne, 27; Venice, 395; Livourne, 11; Bucharest, 54; Glasgow, Brussels, Amsterdam, Nantes, Roubaix, Nice, and Jassy, each 2; Edinburgh, 3; London, Liverpool, Bristol, Rheims, Besançon, Munich, Geneva, and Cracovie, each 1.

LITERARY NOTICES.

First Annual Report of the State Commission in Lunacy, for the year 1889, Albany, 1890. The State of New York has always occupied advanced ground in its care of the insane. It took early measures to remove them from the poor-houses to well-provided State institutions; it separated the acute from the chronic, and constructed special asylums for the latter; it provided a separate asylum for the criminal insane; it created the office of the State Commissioner in Lunacy; and, finally, with the increase of the insane, it has organized a Commission in Lunacy. This is the first report of the new Commission in Lunacy, organized under the law of the last session of the Legislature. It appears that there are now 15,507 insane in custody in this State, being an increase, as we learn from the annual report of the State Board of Charities, of 710 during the year. From the latter report it also appears that the ratio of increase of the insane in this State is 62 per cent of the population, while the increase of population is about 18 per cent. This is a truly alarming increase of insanity, and ought to become the subject of exhaustive study for the purpose of applying remedial measures.

The Commission devotes considerable space to an analysis of its duties under the law, and concludes that it is physically impossible to do the work of visitation required. This is to be regretted, as the real reforms in the management of the institutions for the insane must largely come from the supervision visitations of a competent Commission. Visitations cannot, therefore, be too frequent. After the consideration of some minor topics the report takes up the question of State *versus* County care of the insane, and gives many reasons why the former should be adopted as the policy of the State. The report concludes with some well-collated tables relating to the insane.

Perhaps it was too much to expect in a first report that comprehensive illustration of the condition of the institutions for the insane and of their inmates which the Legislature and

the public so much need, and which formed so conspicuous a feature of the reports of the former Commissioner in Lunacy. In fact, we learn nothing from this report in regard to the officers, organization, or management of the individual institutions for the insane. Instances of the gross abuses of the insane in custody are given, but there is not the slightest intimation of the name or location of the institutions where they occurred. In this respect the Commission shows a timidity which will materially diminish its influence for good. This omission is doubtless due to what appears to be a chronic fault of the highest and therefore the most responsible of our State officials generally in the exercise of their functions—namely, too much reliance upon those who are in immediate charge to particularly supervise them. And such neglect, unfortunately, attains its highest degree when dealing with matters related to the health of the people, whether under the government of institutions or at large. The sanitary condition of asylums, hospitals, colleges, school-buildings, poor-houses, penitentiaries, and jails is habitually neglected by the highest authorities out of too much deference to those in immediate charge, whose attention is absorbed by other matters. Hence the constant excess of deaths and occasional outbreaks of epidemics from preventable causes. The great power of the English Lunacy Commission rests entirely upon its fearless yet just exposure of the abuses in individual asylums. Neglectful superintendents are annually arraigned before the bar of public opinion, and reform follows. We hope to see in the next report of the Commission a complete exhibition of the interior workings of every institution for the insane, public or private, and the responsibility for abuses fixed upon institutions and individuals.

SPINAL CONCUSSION: Surgically Considered as a Cause of Spinal Injury, and Neurologically Restricted to a Certain Symptom Group, for which is Suggested the Designation ERICHSEN'S DISEASE, as one form of the Traumatic Neuroses. By S. V. CLEVENGER, M.D., Consulting Physician in the Reese and Alexian Hospitals; Late Pathologist County Insane Asylum, Chicago; Member Numerous American Scientific and Medical Societies; Collaborator American Nat-

uralist, Alienist and Neurologist, Journal of Neurology and Psychiatry, Journal of Nervous and Mental Diseases ; author of "Comparative Physiology and Psychology," "Artistic Anatomy," etc. 8vo, pp. 359, with thirty wood-engravings. Price, $2.50. Philadelphia and London : F. A. Davis.

This is a truly timely work on one of the most important subjects that engages the attention of surgeons. For more than twenty years spinal concussion has been the frequent subject of contention in law courts, with no standard of reference. The work before us is the evident outcome of much special study and practical experience.

The Chapters are : I. Historical Introduction ; II. Erichsen on Spinal Concussion ; III. Page on Injuries of the Spine and Spinal Cord ; IV. Recent Discussions of Spinal Concussion ; V. Oppenheim on Traumatic Neuroses ; VI. Illustrative Cases from Original and all Other Sources ; VII. Traumatic Insanity ; VIII. The Spinal Column ; IX. Symptoms ; X. Diagnosis ; XI. Pathology ; XII. Treatment ; XIII. Medico-legal Consideration.

It also comprises a description of modern methods of diagnosis by Electricity, a discussion of the controversy concerning hysteria, and the author's pathological view that the lesion is one involving the spinal sympathetic nervous system. In this latter respect entirely new ground is taken, and the diversity of opinion concerning the functional and organic nature of the disease is afforded a basis for reconciliation.

Education and Culture as Related to the Health and Diseases of Women. By Alexander J. C. Skene, M.D., 12mo, pp. 127. Physicians' Leisure Library Series. Price, paper, 25 cents ; cloth, 50 cents, per copy ; $2.50 per set—12 volumes. Detroit, Mich. : George S. Davis.

While containing nothing new, the admirable manner in which the matter that constitutes this manual is condensed and arranged is such as to justify our heartiest commendation of it for the essential knowledge which it contains, without which no woman is well educated.

Practical Sanitary and Economic Cooking Adapted to Persons of Moderate and Small Means. By Mrs.

MARY HINMAN ABEL. THE LOMB PRIZE ESSAY. 12mo, pp. 197. American Public Health Association : Irving A. Watson, M.D., Secretary, Concord, N. H.

The excellence of this long over-due essay, which won the Lomb Prize of $500 at the meeting of the American Public Health Association at Milwaukee, November, 1888, palliates in some degree the delay of its issue.

The accomplished committee, in awarding the prize, said (before the author was known) : "The committee consider it a duty to emphasize the fact that of all the essays submitted" (of which there were seventy), "the one selected is not only pre-eminently the best, but that it is also intrinsically an admirable treatise on the subject.

"It is simple and lucid in statement, methodical arrangement, and well adapted to the practical wants of the classes to which it is addressed. Whoever may read it can have confidence in the soundness of its teachings, and cannot fail to be instructed in the art of cooking by its plain precepts, bounded as they are upon the correct application of the scientific principles of chemistry and physiology to the proper preparation of food for man."

To this may be added that the principles here made use of, though particularly utilized for the special benefit of the classes designated, are of universal application. That, in order to obtain the best results, cooking in the abstract, no matter how high the aim of refinement, requires the application of the same principles as those more clearly described in this little volume before us than in any other work on cooking with which we are acquainted. Hence to all who are interested in *wholesome* cooking—and who is not?—no matter what their station ; to all who would understand the principles upon which the good quality as well as the good cooking of food depends, THE SANITARIAN commends this book as the best of its kind.

WOOD'S MEDICAL AND SURGICAL MONOGRAPHS, Vol. V., No. 2, February, 1890 : Action of Uric Acid in the Causation of Disease, by A. Haig, M.D., London ; Initial Stages of Consumption, their Nature and Treatment, by Horace Dobell, M.D., London ; Ectopic Pregnancy and Pelvic Hæmat-

ocele, by Lawson Tait, M.D. $10 a year ; single copies, $1. William Wood & Co., New York.

ALDEN'S MANIFOLD CYCLOPÆDIA, Vols. XVII. and XVIII., pp. 632 each : Gogo-Holywell.

The special characteristics of this—the best book for its price hitherto published—comprising the qualities of both dictionary and encyclopædia, are well maintained in these as in the preceding volumes. Fifty cents a volume in cloth ; 65 cents half morocco. Ten cents extra if sent by mail. John B. Alden, 393 Pearl Street, New York.

MEDICAL AND SURGICAL REGISTER OF THE UNITED STATES, COMPRISING List of Physicians and Surgeons, arranged by States, giving Post-office Address, with Population and Location, the School Practised, Date and College of Graduation, all the Existing and Extinct Medical Colleges in the United States and Canada, with Locations, Officers, Number of Professors, Lecturers, Demonstrators, etc., the Various Medical Societies, Medical Colleges, Hospitals, Sanitariums, Asylums, and other Medical Institutions, Boards of Health, a Synopsis of the Laws of Registration and other Laws Relating to the Profession in Each State, Medical Journals, with Names of Editors, Frequency of Publication and Subscription Rates, Official List of Officers of the Medical Departments of the United States Army, Navy, and Marine Hospital Service, Roster of Examining Surgeons of the United States Pension Department, a Descriptive Sketch of each State and Territory, embodying such Matters as Location, Boundaries, Extent in Miles and Acres, Latitude and Longitude, Statistics Relating to Climate, Temperature, Rate of Mortality, Number of Deaths from Consumption, etc., the Names and Locations of Prominent Mineral Springs, full Particulars of all National Associations and Societies Relating to Medicine and Surgery, and an

INDEX OF ALL THE PHYSICIANS IN THE UNITED STATES, arranged alphabetically, with the number of the page on which the name appears. 1890.—Price (to non-subscribers), $7.

R. L. POLK & CO., Publishers, Detroit, Philadelphia, Chicago.

The completeness of this revised edition of four years ago by the same publishers is so well stated upon the title-page, as above given in full, that little need be added to show the extent of its usefulness to physicians and all who would know their whereabouts, their relations to public service, institutions of various kinds, societies, medical education, literature, and avocations generally. Introductorily, it is said to contain the names of nearly *one hundred thousand* persons practising medicine in the United States and the Territories. They are catalogued irrespective of pathy, but designated by initial letters, and the names of the institutions of graduation.

The volume consists of eleven hundred and seventeen pages, is tastefully and strongly bound, eminently creditable and suitable to the excellence of the work in other respects.

A Treatise on Fractures. By Professor Armand Desprès, Surgeon of Charity Hospital; Member of the Society of Surgery; of the Anatomical Society, etc. Translated by E. P. Hurd, M.D., Member of the Massachusetts Medical Society; of the Climatological Society; of the Société de Medicine Pratique, Paris. 12mo, pp. 112, illustrated. Paper cover. Price, 25 cents. Detroit, Mich.: George S. Davis.

The design of this translation from the third of the Chirurgie Journalière of Desprès, as prefatorily stated, is to embody that author's ripe experience in the treatment of the more common fractures and to be a guide to the ordinary practitioner. It is necessarily devoid of all redundancy in order to comprehend the most essential features of the subject in the fewest possible words.

Transactions of the Medical Society of North Carolina at its Thirty-sixth Annual Session, April, 1889.

A pamphlet of one hundred and sixty pages comprising about a dozen reports and papers of subjects of interest to medical practitioners generally, and two or three related to preventive medicine, most notably "Deafness—Its Causes and Prevention, from a Rational Standpoint," by I. M. Hayes, M.D., of Oxford. It dwells in particular upon the importance of and inadequate attention paid to the subject; the dangers

common to the neglect of timely and proper remedies and the danger of improper ones ; the causative relations of naso-pharyngeal catarrh, the abuse of the nasal douche and snuffing water ; immoderate smoking—as a frequent cause of chronic congestion of the throat—and the habit of exhaling smoke, especially cigarette smoke through the nose. Drunkenness is the subject of two papers—"Some of the Medico-Legal Aspects of Inebrity," by T. D. Haigh, M.D., of Fayetteville, and "Dipsomania," by J. T. Nicholson, M.D., of Bath, Chairman of Section on Forensic Medicine. Both of these papers are in the too prevalent apologetic strain to accomplish any good results. They would make out that drunkards generally are pitiful invalids, requiring the special care of good nursing at the cost of their relatives or the State, and in no way amenable to the exercise of their wills or to the well-being of society for, in at least nine cases out of ten, voluntarily yielding to drink ; *making themselves* dangerous to society, and debasing their race by perpetuating their kind, possibly in the proportion of the remaining tenth, through heredity ; and it is on account of this tenth that such apologists would persuade society that all drunkenness is disease !

But it is gratifying to observe that, in the discussion of this subject, there were some members who took exception to the extreme views and thought that there was at least some reason to question whether it would not be better to punish drunkards than society.

A REMARKABLE SNAKE STORY current throughout British India is thus summed up in an article on "The Najâ-Kallu, or Cobra Stone," which Professor H. Hensoldt, Ph.D., of Columbia College, New York, has contributed to the March number of *Harper's Magazine :* "Some cobras—perhaps one in twenty—are in possession of a precious stone which shines in the dark. This stone the snake is in the habit of carrying about in its mouth, regarding it as a treasure, which it carefully preserves and defends with its life. At night the cobra deposits the stone in the grass and watches it, as if fascinated, for hours ; but woe to him who then approaches, for the cobra is never more dangerous than when occupied in this manner." The professor tells how he secured one of these precious stones

by tricking its serpent owner ; and how he accounts scientifically for the seeming marvel of " The Najâ-Kallu."

FREDERICK REMINGTON'S illustrations of Thomas A. Janvier's romance, " The Aztec Treasurehouse," now running in *Harper's Weekly*, bear frequent evidence of the careful study which the artist has given to Aztec antiquities and the different phases of modern Mexican life. He has a large collection of the necessary " local color" in his Mott Haven home, which is a veritable museum of curiosities. No man, it is said, has a more valuable collection of the arms and dress of the Mexican Indians than he.

THE COSMOPOLITAN will begin in the April number a new department called " Review of Current Events," conducted by Murat Halstead, in which he will discuss the leading topics of the day with a non-partisan touch.

" PAINTED GREEK SCULPTURE" is announced as the subject of a contribution to an early number of *Harper's Magazine*, by Russell Sturgis, illustrated with drawings from statuary recently discovered at Athens.

NATIONAL CONFERENCE OF STATE BOARDS OF HEALTH.— It has been decided to hold the next annual conference of State Boards of Health at Louisville, Ky., about May 1st. As heretofore, the conference will be principally devoted to the consideration of questions relating to the practical work of State Boards of Health, and in order that the discussions may be of the greatest value a list of the questions to be presented at the next conference will be printed and sent to all State, Dominion, and Provincial Boards of Health. All of whom are requested to send such questions as they deem important to the Secretary as soon as practicable.

C. O. PROBST, *Secretary*, Columbus, O.

MEDICAL EXCERPT.

THE COMPLETE RESECTION OF THE BONES OF THE FACE is the latest of the bold operations performed by M. Pean, of Paris. "This eminent surgeon," says the *Gazette Hebdomadaire*, "has resected nearly all the bony skeleton of the face in a patient who suffered from enormous tumors in the maxillary, the sphenoidal, and the molar bones. It was a case of odontomata with dental heterotopia; some sarcomatous elements existed, but the tumor was in the main a benign one.

"The operation was performed in parts at two different times; a special prothetic application was made, and the operation was entirely successful. During the fifteen months since the operation was performed there has been no sign of return of the disease.

"Dr. Pean says that the operation authorizes the following conclusions:

"Firstly, the total removal of the bones of the face can be successfully made.

"Secondly, the removal is indicated in the cases of asteofibroma consecutive on dental heterotopia, when the new formations occupy simultaneously three maxillary bones.

"Thirdly, in such cases it may be followed by a lasting cure; and

"Fourthly, the deformities and the functional troubles which they occasion may be corrected by artificial means—*prothesis.*"—*T. P. C.*

SPECIAL CONDITION OF THE LUNGS IN LA GRIPPE.—"A diminution of the respiratory murmur throughout the whole or only a part of the lungs, accompanied with an increased resonance and an increase of vocal vibrations," is the subject of a communication to the Société Médicale des Hopitaux, by M. Ferrand (reported by the *Gazette Hebdomadaire*), regarding a special condition of the lungs following the prevailing epidemic of influenza. He adds: "I think it resembles the state of atelectasis of the lungs, which in some cases pass into a true pneumonia, and herein consists the chief interest."

Cases of pulmonary congestion followed by pneumonia are far from being rare in the present epidemic, and the practitioner should be careful to make thorough auscultation of the patients. Vesicatories, whatever may be said to the contrary, give very satisfactory results in those congested conditions of the lungs which are met with in the first stages of such cases of influenza, or which occur in cases of relapse with a tendency to broncho-pneumonia.

In such cases the translator has obtained excellent results from dry cups, particularly in children, because blisters are too severe, and in adults cups give immediate relief to the congestion and consequent dyspnœa, and may be followed, if thought advisable, by blisters, as the skin is not injured by the cup.—*T. P. C.*

La Grippe followed by lethargic sleep has been observed in Italy. On February 23d a case is reported in *Las Novedades*, from Reggio, of a man who had an attack of *la grippe*, and was prostrated with a lethargic sleep, from which the doctors have tried ineffectually to arouse him. He was still living at the time of the report, forty-eight hours subsequently, and great care was being taken to give him sufficient nourishment by rectal injections to sustain life.

Another case of a similar character occurred near Pavia, of a girl who had the grippe for two days, who fell into a lethargic sleep and lost nearly all signs of life. Her heart-beats were extremely feeble and frequent. The Italian doctors are studying these cases with the greatest interest.—*T. P. C.*

Aconitine—a Reliable Method of Prescribing Same. —Notoriously, the various brands of aconitine in the market exhibit very marked differences in the strength of their physiologic action ; so that the observance and expression of a rigorous distinction between different makes and grades is a matter of most serious importance in prescribing.

It is, therefore, very opportunely that Dr. Van Renterghem, to whom medical literature already owes a most excellent posological (dosimetrical) compendium, has taken the pains of subjecting several aconitines of various origins to a series of exact therapeutic tests.

Dr. Van Renterghem experimented with the following kinds:

Aconitine, crystallized, MERCK—"Merck's Index," p. 9; DUQUESNEL.

Aconitine, amorphous, MERCK—"Merck's Index," *loc cit.*; FRIEDLÄNDER; CHAUTENAND—*Granules.* He used his own person as an object for the experiments.

The first subjective phenomena discernible appeared about twelve to fifteen minutes after the ingestion of the respectively "sufficient dose" (see below !). They consisted of a sensation of vermiculation or formication in the cheeks, and of prickling or tingling in the point of the tongue. Both sensations disappeared after one or two hours, if the dose was not repeated.

The "sufficient dose" for this effect was found to be:

"Of the two crystallized aconitines, MERCK or DUQUESNEL: from 0.25 to 0.5 milligramme ($\frac{1}{250}$ to $\frac{1}{125}$ grain);

"Of the amorphous aconitines of MERCK and CHAUTENAND: from 10 to 15 milligrammes ($\frac{1}{6}$ to $\frac{1}{4}$ grain);

"Of FRIEDLÄNDER'S aconitine: from 200 to 300 milligrammes (3 to $4\frac{1}{2}$ grains)."

Thus showing a range of comparative degrees of potency, as from 1200 down to 1—that is, the like effect being secured from the strongest preparation by a dose only $\frac{1}{1200}$ to $\frac{1}{800}$ the size of those required of the weakest preparation tested under the name of "aconitine !"

Van Renterghem has repeatedly taken the following quantities of the above-mentioned various "aconitines" in the course of twelve hours, in divided doses, without experiencing any grave symptoms in consequence:

Aconitine, crystallized, MERCK or DUQUESNEL: 3 to 4 milligrammes ($\frac{1}{20}$ to $\frac{1}{16}$ grain);

Aconitine, amorphous, MERCK or CHAUTENAND: 50 to 60 milligrammes ($\frac{3}{4}$ to 1 grain);

Aconitine, FRIEDLÄNDER: 1 gramme (15 grains).

During the experimental period, Dr. Van Renterghem attended to his practice—constantly enjoying calm nocturnal sleep, from which he awoke in the morning free from any symptoms of aconitine toxication.

For his patients, Dr. VAN RENTERGHEM has, during a num-

ber of years, regularly prescribed aconitine by the following formula of prescription :

" Aconitine, crystallized, MERCK, 0.005 gramme ($\frac{1}{12}$ grain) ; glycerine, 1 drop ; gentian extract and honey, about equal quantities of each—sufficient to make 200 pills of 15 milligrammes ($\frac{1}{4}$ grain) weight each !"

Although the medicament has been prescribed by him in this form for a long time, not a single instance of medicinal poisoning thereby has come to his notice.

A confusion of the various sorts of aconitine by the compounding druggist is not liable to occur when the above exact mode of designation is used in prescribing.

The pills made by the above-quoted formula are small and completely soluble.

According to Van Renterghem's copious experience, the form and combination here recommended are the safest known for the exhibition of this heroic medicament.—*Merck's Bulletin for January.*

ALUMINIUM ACETO-TARTRATE comes in transparent, very faintly yellowish, crystalline-looking granules, soluble in water, but insoluble in alcohol, ether, or glycerine.

Its use in therapy is due to its caustically astringent and energetically disinfectant properties, which were first observed and tested in 1885 by Schäffer, of Bremen, and by Lange, of Copenhagen.

Recently, Dr. Holste communicated the following observations made by him on the action of this double salt in nasal diseases :

" In ordinary nasal ulcerations (in which this medicament was first employed), it is preferably mixed with boric acid or some indifferent substance, as otherwise it may be too irritating !

" In the above-indicated combination it acts hydrotically on polypi—causing them to shrivel. Aluminium aceto-tartrate is also of excellent service, in combination with the galvanocautery, for destroying polypus roots.

" In ozena, a tampon charged with an aqueous solution of aluminium aceto tartrate is introduced into the nostril and left there for a brief period. Insufflations of this medic-

ament were also employed with good effect—showing cessation of the fetor and abatement in the scab-formation.

"In chronic hypertrophic rhinitis, a rapid subsidence of the swelling was brought about by the following treatment: Insufflations of aluminium aceto-tartrate with boric acid, equal parts, or 1 to 2; alternating with tampons of borax glycerolate and with the galvano-cautery.

"In almost all the cases under observation, the patients speedily became reconciled to the medicament; which soon afforded them notable subjective relief, while promoting a cure."

Michaelis prescribes the following in rhino-pharyngitis, with tendency to form scabs:

Solution of one part aluminium aceto-tartrate in three parts of water: use one tablespoonful thereof in a pint of water, for snuffing-up into and through the nose.

The same authority also recommends a fifty-per-cent solution of aluminium aceto-tartrate as a wash in chilblains.—*Merck's Bulletin for February.*

IODOLE, "ATOMIZABLE"—NON-CONGLUTINATIVE.—Fine crystalline powder, for insufflations in rhino-pharyngo-laryngological affections, etc.

Further communication on this subject was made, since its last mention in this journal (*Merck's Bulletin*, 1889, p. 37), by Dr. MAX SCHÄFFER, of Bremen, as follows:

"The efficacy of iodole powder for insufflations was formerly, as I noticed, grievously impeded by its conglutinating into small nodules already in the cannula of the apparatus—thus rendering impossible a uniform distribution of the powder over the mucous membranes. When the powder once had reached the mucous surface, its tendency to conglutinate became evident in a still augmented degree. Hereby the effect of the medicament was rendered almost wholly nugatory; for the aggregations formed by it produced a marked mechanical irritation, which in turn stimulated the secretions of the parts treated; in consequence whereof the powder was simply and speedily swept away by the fluids of the nasal and rhino-pharyngeal cavities, or coughed away when applied to the larynx or trachea.

"After trying in vain to remedy this difficulty by mixing the iodole with finely crystallized boric acid, I received from

E. MERCK in Darmstadt a new form of iodole, of extremely fine crystalline texture, which fully obviates the troubles described.

"It spreads uniformly over the assufflated surfaces; and, owing to its well-defined and sharp crystalline form, it fairly penetrates into and fixes itself in the upper stratum of the mucous membrane—thus affording the secretions ample time to develop the medicinal action of the iodole by resorption.

"In a large number of test-experiments with nasal diseases (including ozena atrophicans, ozena syphilitica, and purulent affections of the bone); also with affections of the tonsils, of the larynx; tubercular ulcerations; grave tracheal troubles—I have satisfied myself absolutely that the crystallized iodole actually gave the effects to be expected from iodole, which I had missed with the older forms of iodole—simply because these were entirely or partially incapable of resorption."—*Merck's Bulletin for February.*

AMMONIACAL LIQUOR VAPORIZATION AND CROUP.—Quite a number of years ago I saw a paper read before the American Gas Light Association that the vaporization of ammonia water of gas works was a fine remedy in cases of croup. I have since tried it with good effect. Last winter my little girl, aged nine years, had a sudden attack of croup. She went to bed apparently well, but about midnight gave a most heart-rending "bark"—one that makes a parent shiver. I commenced to vaporize the water, but before I got things ready she was gasping for breath. As soon as the room began to fill with the vapor she sank into the sweetest sleep imaginable, and arose the next morning as well as usual. She had had a bad attack of diphtheria in her fourth year. What I wish to know is: First, does the water lose its good qualities with age? Second, is the water in works making a mixture of water and coal gases as good as that from pure coal gas? If you will give me the information through your valuable paper, I shall be obliged to you, and it will probably benefit others.

W. N. GRUBB,
Secretary.

[*Answer.*—First, not if kept properly sealed; second, the most efficacious liquor is that obtained from coal gas works pure and simple.]—*American Gas Light Journal.*

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NUMBER 245.

THE WATER SUPPLY OF MEMPHIS.

By J. M. SAFFORD, Ph.D., M.D., Chairman of the Committee on Water Supply.

A CHAIRMAN of a committee comes readily to the work of reporting when the subject-matter in hand is an enterprise that has proved eminently successful—eminently to the extent of richly endowing a city with one of the greatest gifts of Providence. Such an enterprise is that of "The Artesian Water Company of Memphis," and such a gift is the full and free-flowing crystal water now supplied to Memphis people.

In May of last year the writer visited Memphis for the purpose of inspecting its water supply. Through the courtesy of the officers of the Artesian Water Company, he was enabled to inspect personally the wells and their products, the tunnel, stand-pipe, power-plants and plans of plants, and to survey the general topography and the locations of the several wells and plants within the city. Much information was obtained bearing upon the history or evolution, as we may say, of the present system, the quantity and quality of the water, and upon the formations underlying the city and penetrated by the deep borings.

With all the data at command a good-sized book might be written. Our report, however, will be brought within moderate limits. The wood-cuts have been supplied through the kindness of Mr. R. C. Graves, vice-president of the company, to whose keen foresight and untiring energy the Artesian Water System, of which I write, is indeed a grand and living monument, a statement, I am sure, the good people of Mem-

phis will heartily indorse, of whom the following is from the *Great South* of June, 1889:

"Vice-president R. C. Graves was born at Sunderland, Mass., in 1843, and coming to the West early in life, located in St. Louis, where he engaged in the ice business. About twenty-two years ago he came to Memphis representing the Bohlen-Huse Ice Company, of which concern he is now general manager. His industrious habits and his reputation for honesty and integrity won for him a high social position. In 1881 he was appointed by the Governor of the State to fill the unexpired term of Dr. D. T. Porter on the Board of Police Commissioners, to which position he was afterward elected by popular vote for a term of four years. He soon, however, resigned this and devoted all his spare time to the development of his plans. He had a double motive, one to secure pure water from which to manufacture ice, and the other to establish a system by which the city's water supply could be improved. He began experimenting with artesian wells, the first effort proving successful, as related elsewhere. . . . To Mr. Graves more than to any one else is due the credit for the excellent water system Memphis to-day enjoys."

The cuts illustrating this description are reduced from drawings made by Mr. Thomas T. Johnson, the accomplished chief engineer in charge, who has won for himself an enviable name in the conduct of this work, and by Mr. J. H. Spengler, his efficient assistant.

HISTORY.

"From Well and Cistern to Wolf River—From Wolf River to Artesian Water." Such, or nearly such, is the heading of an article before me on Memphis water. It is history in a nutshell. I cannot do better here than to quote from an editorial in the number for August, 1887, of the *Mississippi Valley Medical Monthly*, now the *Memphis Medical Monthly*. At the time the editorial was written, two years and a half ago, the consummation was not in sight. But a "new hope" had dawned upon the city. A discovery had been made. A pipe driven down 354 feet below the surface had revealed the pregnant fact that, beneath a bed of stiff, impervious clay, there lay an unfathomed stratum of sand loaded with water, a

vast, surcharged reservoir indeed. The clay was shown to be a veritable cover holding the imprisoned water down. This was evident, for when the pipe, which had perforated the clay to the sand, was cleared, the water promptly followed, boiling out at the top and overflowing profusely, making a grand and free exhibition—rather more than had been bargained for.

The overflow was at the time the wonder of the city and created widespread and profound interest. It remained to test the quality of the water, and very soon the best assurances were given that it was both pure and wholesome.

But to the quotation from the *Monthly :*

" Up to the time of the introduction of the present system of water-works the city and citizens relied entirely upon underground cisterns and shallow wells for a supply. The latter have been constantly contaminated by surface percolation, and thereby rendered unfit for domestic purposes. Thus these wells have not only contributed largely to the production of malarial and gastro-enteric conditions, but have, in the knowledge of the writer, done much for the spread of specific, contagious, and epidemic diseases in our midst. The cisterns have furnished little better record, as but few can be found at any season of the year that are water-tight.

" The introduction of Wolf River water was hailed with delight by all who understood the dangers of constantly using the disease-breeding waters of superficial wells and imperfect cisterns. The feeling was encouraged by the known fact that the water from this river was above the average in purity of that furnished most cities. It was regarded as the third best water furnished to cities. This, however, was when it was clear, either from settling or filtration. Unfortunately, no effort has been made to do either, and the result has been that during all our rainy seasons and after each rainfall in more settled weather, mud and water, water and mud, at times almost equal parts, are pumped into the city for the use of its inhabitants under the euphonious cognomen—water. Day after day, and year following year, a long-suffering people prayed for the correction of this imposition, but a conscienceless corporation, with its deadly grip upon the vitals of the people, by reason of their necessities, has continued to send the mud and exact liberal pay therefor.

"Our readers will be glad to learn that a new hope has dawned upon us, and that erelong Memphis will be able to boast of an abundant supply of the purest water ever furnished to any American city."

The latter paragraph puts it strongly, but the reader will find, as we progress, that the actual results to date justify the statement though made so many months ago.

THE FIRST ARTESIAN WELL.

The startling overflow of water to which I have referred above, an overflow at once a wonder and a revelation, was the initial performance of the first artesian well. Mr. R. C. Graves, Superintendent of the Bohlen-Huse Ice Company of Memphis, seeking the purest water obtainable for making ice, had been boring wells for it, successfully, too, though so far none had proved to be artesian. In 1887 he began one in the lower part of the city, at a point on Court Street near the bayou, the locality of one of the ice factories. After boring down 354 feet the water boiled up as already stated, giving to Memphis its first or pioneer self-flowing well. The water was clear and sparkling, tonic and palatable. People drank of it. Crowds soon collected about the flowing fountain. Policemen were in requisition. The news spread like wild-fire. The elixir of life had been found. Memphians of all degrees, high and low, old and young, with buckets and jugs, coffee-pots and tin cans, waited in long files to be served, each in turn, from the gushing hygienic well. And so for days. In good weather there could be seen lines of baby-carriages, each with its little occupant, reaching from the well a square or so away. Physicians gave prescriptions: "Let the baby drink artesian water." Ailing mammas and dyspeptic papas drank it, too, and continued to drink, and do now even to this day.

The well kept boiling up for weeks and months, with no signs of abatement. The people thought it as cold, as stimulating, as crystal as ever. A great practical test had been made and had demonstrated its popularity and its quality, and there were whispers in the air, "What next?"

We have now reached a period in the history of the Memphis water supply when circumstances had so far ripened as to present a grand opportunity for some master hand and brainy

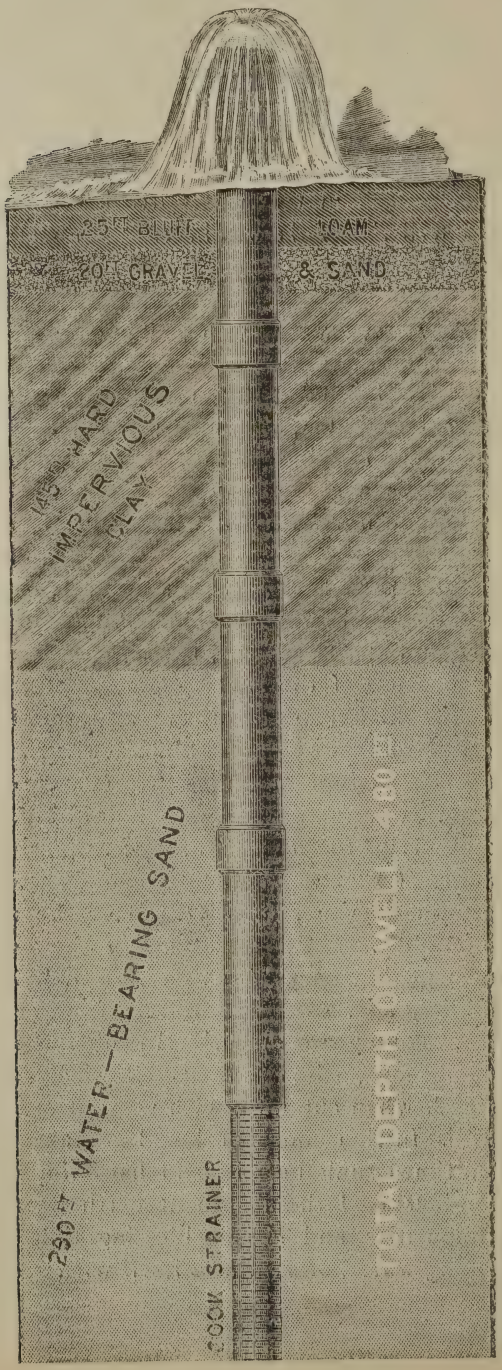
head to serve his people and win for himself great distinction. Why not supply the whole city with artesian water? and in abundance, overflowing, like the pioneer well? The genius of Mr. Graves was equal to this. He suggested the question, studied the matter, was convinced of its feasibility, had the water analyzed, firmly faced all opposition, organized a company, and before the matter was fairly known was at work "boring new wells." This was in 1887. The "new hope" had dawned.

A TYPICAL WELL AND THE SECTION.

The cut on the following page is a graphic representation of a typical well and its parts, and gives an instructive section of the strata. The location of such a gusher as this, let it be understood, is necessarily in a low part of the city, say, near the bayou, and not above high-water level of the Mississippi River.

We first study the strata. The section is an epitome of them as found in the Memphis region. All are present.

First, at top and at the surface, is the *bluff loam*, here only 25 feet thick, because of the low topography of the particular locality. In the higher parts of the city the formation is much thicker. It makes the great bluff at the river front and overhangs the Mississippi for miles. It is the bold, vertical escarpment of this formation, as seen by old river men, that has given to Memphis the name "Bluff City." Its maximum thickness is about 60 feet. At the stand-pipe, west of Shelby Street and south of Vine, it is 53. It is the great visible stratum of Memphis. The foundations of the city are in it. It is known to geologists as *loess*, and, in their language, of recent Quaternary age, a deposit dropped from muddy water, back "ten thousand years or so." In substance the formation is a fine, siliceous, ashen or light-yellowish earth, compact enough to stand, when cut into, with vertical faces of 40 feet or more. It is further more or less limy, and the shallow wells of olden times sunk into it held hard limestone water. As population increased the absorbent earth became impregnated with impurities, and it is a blessing that it no longer supplies drinking water, or saturates itself with sewage.


35 FT BLUFF
20 FT GRAVEL
10 AM
& SAND
145 FT HARD IMPERVIOUS CLAY
230 FT WATER-BEARING SAND
TOTAL DEPTH OF WELL 480 FT
200K STRAINER

As a formation the loess spreads over Shelby County and makes the uplands, yielding a strong and fertile soil, once laden with grand forests, now in summer carpeted with fields of luxuriant cotton and corn. Eastward from Shelby it has risen to a feather-edge, and soon disappears, giving place to subjacent and now, in turn, outcropping beds. Northward and southward, the belt of the loess extends for long distances, entering Kentucky on the one hand and Mississippi on the other.

Second. Below the bluff loam or loess we have the "*gravel and sand,*" 20 feet in thickness. For shortness let us call it *the gravel.* This formation outcrops at the lowest points in the immediate beds of the Mississippi, the Wolf, and the bayou. Elsewhere at all points over the territory of Memphis it underlies the bluff loam. Bore anywhere and you first penetrate the loam and then strike the gravel. The higher the locality the thicker the loam.

The bed of gravel is from 20 to 25 feet thick in the region of the company's wells along the bayou. (See map.) At the base of the bluff, in front of the stand-pipe, it is full 60. The entire bed comes near lying between high and low-water levels of the Mississippi. Its bottom is about horizontal, rarely falling as much as 8 feet below low water. Its top at the wells is 16 to 17 feet below high water; at the stand-pipe it is as much above.

The gravel bed is so widespread, and its relations to other strata, to the low-water level of the Mississippi and to the topography of the city, are of such a character that it unquestionably has had its influence for good or ill upon the sanitary status of Memphis. Either it has been an underdrain for carrying objectionable matters away, or else a reservoir for retaining them. Doubtless in the earlier days of Memphis many wells terminated in the gravel. No comment is needed as to the sort of water they afforded. In case of either drain or reservoir, the water must have been more or less foul.

The great body of water being above the low-water line, and its base at the same time resting upon a floor of impervious clay, I am inclined to the former view. The question, however, is out of time now. It may, indeed, be thrown aside, for it is certain that the bed as a sanitary factor has lost

its importance since the present splendid and mutually supplemental systems of water supply and sewage have been wrought out and established.

The "gravel and sand," known also as the orange sand formation, is placed by geologists, like the bluff loam, in the Quaternary of their classification. It represents a step farther back in time. Its lateral geographical extent is far greater than that of the loam. East of Shelby County it comes out from under the loam and becomes, eastward, the most conspicuous among the surface or superficial formations. It is seen over great areas of country, plains, and hills, as far as the Tennessee River. Its *orange sands* are well exposed in the railroad cuts and in washes from Fayette and Hardeman to Weakley and Henry, to say nothing of exhibitions of it beyond these limits, north and south, in other States.

Third. The *impervious clay*, 145 feet thick. The two strata of the section above considered represent the visible formations of Memphis, those seen at the surface, the bluff loam, dominant, and the body of the land, the gravel, barely outcropping in the lowest places at low water. We come now to the unseen subterranean beds, the ones that make possible the artesian wells. There are two of these, both of remarkable character, the clay and the sand below it. Both are referred to the *tertiary* division of geologists.

The clay, in the section of the hard impervious clay, lies next under the gravel, and therefore below low-water mark throughout the whole region. Its top is nearly horizontal, and appears to have been planed off by some denuding agency before the overlying materials were deposited. It is a dark, stiff clay. In places it is laminated in structure, consisting of layers separated by thin seams of sand. It often holds sticks and fragments of wood converted into lignite, a half-made or quarter-made stone coal. Beautiful impressions of leaves of many species are common in it, and lumps and wedges of clayey iron carbonate are now and then met with. As a whole, it is a heavy, massive stratum of impervious material through which water cannot rise.

The formation makes the floor or bottom bed of the Mississippi River in front of Memphis, and further has supplied a foundation for the west pier of the new bridge now building.

It has been utilized by the Artesian Water Company as a horizon in which to construct an underground tunnel, a most interesting and ingenious work, and one which the nature of the clay made practicable. The tunnel is cylindrical in cross-section, and was excavated or driven in the clay, as miners excavate or drive passageways in solid rock. As the excavation advanced it was walled around with brick laid in cement. We thus have a tube of solid masonry running like an artery, and away from daylight, through the clayey mass. The internal diameter of the tube is 5 feet, in which a good-sized mule might stand. Its axial centre line is from 25 to 30 feet below the top of the clay, 33 feet and 69 feet respectively below low and high-water levels of the Mississippi, and 76 feet, or thereabouts, below the common height to which the artesian water rises.

The tunnel will be further spoken of and illustrated beyond.

Fourth. The *water-bearing sand.* This is the mammoth stratum. The thickness given, 290 feet, is but a fraction. Exploration by boring has shown it to be little less than 800 feet. With the exception of an unimportant lens of clay now and then, it is sand from top to bottom, and water-bearing throughout. It thus becomes an enormous reservoir for an indefinite supply. Its sands vary in character at different levels. At top fine sand is met with, through which the movement is comparatively slow. In lower horizons it is coarser, and at a depth of 400 feet, more or less, it permits the free passage of water and an abundance of it. In the coarser sands, pebbles as large as peas are sometimes found.

The base of this great stratum of sand was found, by a test well, sunk for exploration, to be 971 feet below high-water of the Mississippi. The stratum rests upon a lower bed of clay, which has a thickness of 45 feet. Under this, in turn, is still another bed 125 feet thick, which brings us to the bottom of the boring, 1156 feet below high water of the river, and 1165 feet below the surface, or mouth of the well. This lowest or bottom bed is clay at the top, but shades off downward into sandy clay, the deepest known material in this region.

THE TYPICAL WELL,

as seen in the section, shows for itself. It consists essentially of two parts, the tube and the strainer. The tube is made of

one fourth inch, lap-welded steel, and measures eight inches in the clear inside. The strainer is a most important part. Mr. Graves insists that "it is practically the well." It is a perforated brass tube 50 feet long, made long that the water may feed into the well with an easy flow. Its internal diameter is seven and one half inches, or one half inch less than that of the tube with which it is connected above. It is made of brass the better to resist corrosion.

Water enters the strainer through horizontal slits in its sides. The cut shows the slits well and gives some idea of their great number. The vertical distance between any two is about one inch. The length of a single slit is approximately two inches, but the width is very small, sometimes not more than the one hundredth of an inch, a mere crack, hardly admitting a visiting card of medium thickness. The slits are so narrow externally that the outside of the strainer appears smooth; inside, however, they are widened out. The vertical cross-section of a single whole slit is V-shaped, the angle of the V being at the outer surface, and the top of the V at the inner, but one fourth inch across. The very close meshes thus made enable the water to pass in freely but keep back the finest sand. The strainer in practice works admirably, the water entering it being clear and hardly showing a trace of grit. When practicable it rests in horizons of coarse sand. This indispensable appendage is manufactured by the Cook Well Company of St. Louis.

THE FORMATIONS FURTHER: SOURCES AND MOVEMENT OF WATER.

The strata shown in the cut are but parts, and small parts, respectively, of as many widespreading formations. Once, before the Mississippi River had cut its valley-plain out of the two uppermost, the loam and the gravel, all extended scores of miles toward all points of the compass. The two lower and greater, the non-pervious clay and the water-bearing sand, including subjacent beds, which the deep boring has told us of, do so now.

We note again, that all the strata, in their eastern extension, rise gradually to the surface, outcropping in successive and parallel belts, that lie lengthwise between the Tennessee

River ridge and the line of the Mississippi River bluffs. The outcrops are not always apparent to observers, being hidden by soils and superficial formations, but they are none the less real. The water-bearing sand is sandwiched between two clays, the impervious above and the deep, subjacent one below. The upper in the extension easterly has its outcropping belt in Fayette County ; the lower, I take it, finds its outcrop and counterpart in the belt of clay, often rough and hilly, which lies east of Bolivar, west of Middleton and Henderson, and extends south and north quite through the State into Mississippi and Kentucky. Between these outcrops is that of the water-bearing sand, occupying an area 20 miles across and indefinite in length—a very great area, upon which the rains of heaven fall freely and in which wholesome springs abound, rivers flow, and smaller streams have their headwaters. The part of this area lying in Hardeman and eastern Fayette, in Tennessee, and in Benton and parts of Tippah and Marshall, in Mississippi, is doubtless the surface which gathers and drinks in the waters for the Memphis supply ; other sections may contribute, but their quotas are small in comparison. The elevations above high water at Memphis in this contributing region are, for the general surface, an average of about 300 feet, and for the larger streams (railroad crossings) from 110 to 175 feet.

We have here all the conditions necessary for the gathering, the accumulation, and the retention of the store of water found beneath Memphis. We summarize them as follows : All the strata dip or are tilted to the west. The thickest of them, a great, spongy sand, has its upper part (its eastern edge) outcropping over a wide extent of high country in the counties mentioned, and its lowest part deeply buried beneath a superincumbent clay at Memphis. From the area of outcrop of the sand to the buried parts at Memphis, is from 45 to 60 miles, and the fall not less than 600 feet. The superincumbent clay is an important factor. Going westerly, its feather-edge first appears on high ground in Fayette, overlapping the great sand ; thence it falls with decided dip to Memphis, passing out of sight under low water. From the first the clay covers the sand, and finally, at Memphis, deeply buries it, as stated.

The strata so disposed, the various and abundant waters of the area where outcrops the great sand, or a good portion of them, sink into the porous earth and filter for miles through the sands to the depths below Memphis, and there accumulate to the complete filling of the stratum, or its more deeply buried portion. The superincumbent clay, the impervious of the section, acting as cover, holds the waters down. Let this cover be pierced and forthwith an artesian well begins its overflow ; so, at least, if the mouth of the well is at a low topography ; if high, the water rises till the head of pressure is relieved.

We add that there is good reason for believing that Memphis is located in a great shallow trough of the strata, the latter dipping not only from the east but from the west as well, and meeting at and under the city and the river. This was once true of all. But now the statement as to the loam and gravel, the two upper formations of Memphis, needs modification, for these, west of the Mississippi for 40 miles, have been mostly washed away to form the great valley-plain of the river.

The kinds and conformations of strata seen at Memphis have a long northerly and southerly extension. In this we see the possibilities or the probabilities as to finding like water at other points. Local peculiarities would come in sometimes to change the conditions.

THE WELLS.

In May last there were in all 57 bored wells in Memphis, 52 of them known as "deep wells" and 5 as "shallow wells" or "185-foot wells." All are included in an area three miles long by one mile wide, the belt being nearly lengthwise with the river. The water in all deep wells, whether located on high or low ground, rises, or would rise, to a common level, which is seven feet or thereabouts above high water. If the surface is below this level, the wells of course overflow unless piped up to it. This height of water is constant regardless of the height of water in the river.

As examples of wells on high ground, those at the ice factory on the bluff above the river, at the foot of Trezevant, and at the Tennessee Brewery, not far away, and having about the

same elevation, may be given. At the ice factory, 60 feet above high water, is the original deep well bored in 1886. It is 428 feet deep and yields by pumping 100 gallons of water per minute. There are here also two of the shallow wells, 184 feet each in depth ; water clear, but not so good, as shown by analysis.

At the brewery is a second deep well, bored to a depth of 437 feet ; yields, as the other, 100 gallons per minute, this being the capacity of the pumps or cylinders ; water clear and supply constant. There is also a shallow well here, and similar to the two of the ice factory in its depth and water.

The principal hotels of the city have each a deep well of their own, the water supplied being used satisfactorily for all purposes, including drinking and the laundry. That of the Gayoso was among the first wells sunk.

Passing to the low grounds of the bayou, we have many wells. This is the region of artesian overflows. The " first artesian," at the ice factory on Court Street, near the bayou, has been noted. This has a fellow and the two have the same depth, 354 or 355 feet. The surface here is at about the natural flow-line of the wells, a few feet higher than the location of those along the railroad.

The Artesian Water Company obtain their supply from a group of 32 deep wells, and upon this, as a part of their great water system, our interest now centres. The map on the following page shows the location of the wells, with reference to the track of the Louisville & Nashville Railroad, the streets of the city, the bayou, the shaft, pump-house, and the line of the subterranean tunnel. The ground is low, at some points a little above high water, and at others below it. The average depth of the wells is about 400 feet. At this horizon the sand is coarse and the supply of water ample.

THE TUNNEL.

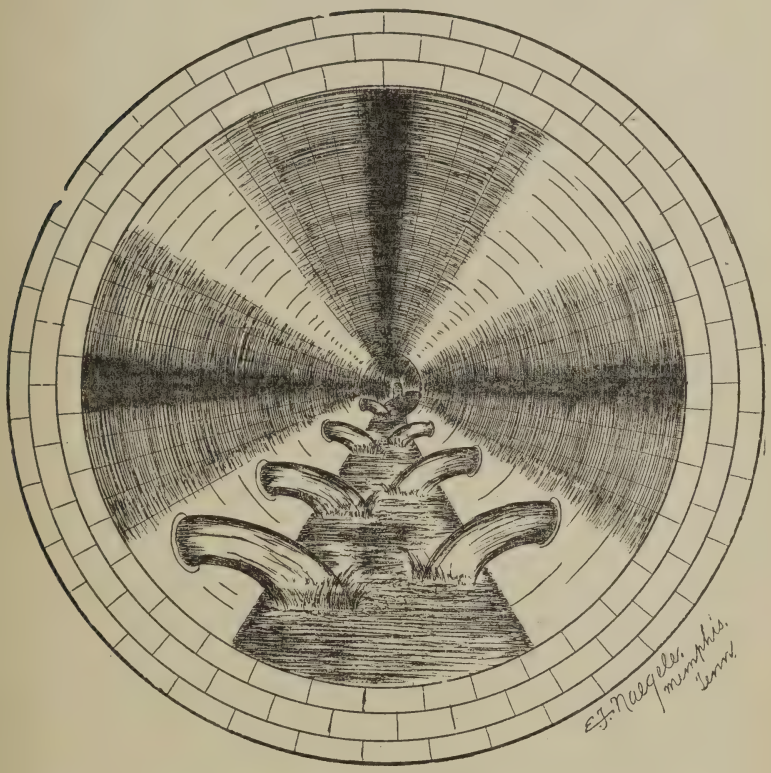
The heavy black line is the course of the unseen tunnel as a surveyor might stake it off on the surface. Although not so shown in the cut, the tunnel, let it be understood, lies deeply below the railroad, streets, and bayou. It is 3000 feet long, or a little more than half a mile. One arm, extending easterly,

is nearly under the railroad and approximately parallel with it; the other arm, at right angles to the first, lies hidden beneath an alley of the city. The black dots are the wells, and

the fine lines running from them represent their underground connections with the tunnel.

The tunnel was noticed on a previous page when considering the non-pervious clay in which it has been excavated. The accompanying cut gives at once a cross-section and an internal

view. The tunnel inside, it will be recollected, has a diameter of five feet. The brick masonry of the circular wall is well seen. The bent pipes at the bottom are the terminations of



JOHN T. JOHNSON, *Chief Engineer.* J. H. SPANGLER, *Ass't Engineer.*

horizontal pipes, the underground connections, coming from the wells. The water is represented as pouring in from the wells. It comes in under pressure, for the tunnel is 76 feet below the upper limit of artesian flow. With the connecting pipes fully open, and no pumping done, or it may be with or without pumping, the tunnel soon fills with water.

The tunnel is a common conduit designed to gather the water from the scattered wells and to convey it in ample volume to the pumps.

THE PUMP-ROOM, THE DRY AND WET CHAMBERS, AND THE PUMPS.

The company has a handsome building fronting on Auction Street, which is known as the pump-house. Its location is given on the map. The building contains the pump-room, boiler and coal-bins. The pump-room is essentially a *dry* chamber or "well" sunk in the earth, like a cistern, to a depth of 45 feet, and having a diameter of 38 feet. But this is not all. From the bottom of the floor of the dry chamber there extends, still deeper in the earth, another but smaller chamber. This is known as the *wet* chamber or well. Its diameter is 10 feet. Its mouth has a central position in the bottom of the dry chamber, as if a sort of sink or cellar to it. The chamber or wells may be designated, respectively, the upper and the lower.

The upper contains the great pumps. The lower is connected directly with the tunnel, receives its water and supplies the pumps. The bottom of the upper chamber is 44 feet below high water of the Mississippi, and therefore 51 feet below the highest level of artesian flow. This involves great pressure upward from the tunnel and lower chamber. To meet it and confine the water the floor of the upper chamber has been made exceedingly solid and strong, and the mouth of the lower chamber closed with a massive cover of great weight and securely anchored. The pumps, perpendicular in position, are set in perforations of the cover and screwed fast with great bolts.

"There are three pumps in position, and room has been provided for a fourth, should necessity require it. The aggregate cost of these is $175,000. The capacity of each pump is 10,000,000 gallons, making the aggregate capacity 30,000,000 gallons daily, which will be sufficient to supply the most extravagant consumption for years to come, even should the growth of Memphis continue up to the proportion of the last three years."—*Appeal.*

The best of everything has been a *sine qua non* with the company. Engines, plants, and appointments of all sorts connected with the control and distribution of artesian water have been required to be of the first order in material and construc-

tion, regardless of labor and cost. With them the end justified the means.

THE STAND-PIPE.

This structure is a good illustration of the ambitious animus of the company. It is an enormous tube standing upright on the highest spot in Memphis. The location is south of Vine Street and between Shelby and the river, a point of the bluff 66 feet above high water. The stand-pipe overlooks the river and commands it up and down stream for miles. It rises 160 feet above its base, 126 above high water, and 219 above the highest level of artesian overflow; has an internal diameter of 20 feet, and a capacity of 400,000 gallons. It is built of rolled steel plates, which at the bottom are an inch and a quarter thick, and at the top three fourths of an inch. The stand-pipe is connected with the city mains, and is a safety-valve quite in harmony with the general high character of the water-system.

QUALITY OF THE WATER.

The artesian water is wonderfully pure. It is on record that a distinguished chemist, Dr. Charles Smart, Major and Surgeon, U. S. Army, after analyzing a first sample sent to him, would not believe that it came from Memphis. Can any such water come out of Memphis? the doctor's faith could not be established until other samples had been sent, the genuineness of which had been formally certified to by the President of the Memphis Board of Health. After the second analysis he became assured, and then wrote: "I know of no city which has a water supply as pure as the samples now reported on."

The water was also analyzed by Professor J. W. Mallet, of the University of Virginia, and Professor E. H. S. Bailey, of the University of Kansas. Both of these chemists fully recognized its comparative purity and expressed a decidedly favorable opinion of it as a drinking water.

My own observations have impressed me with the high character of the water. It is clear, colorless, with a minimum of mineral substances and wonderfully free from organic matter. It is, furthermore, sparkling, pleasant to the taste and refreshing, without odor, slightly chalybeate, and, as it comes from the wells, has a temperature of 62° F., constant the year round. Showing no traces of sewage and being thoroughly secured

against sources of pollution, there can be no doubt as to its wholesomeness; and this the improved health condition of Memphis since its introduction would appear to demonstrate. A question has been raised as to the effect upon the system of a long-continued use of a chalybeate water; but this water is so slightly chalybeate that the question as to it can hardly be entertained. As Professor Bailey says in his report, the "carbonate of iron cannot, I think, be objectionable, and may act as a tonic upon the system."

ANALYSIS OF MEMPHIS ARTESIAN WATER.

	Smart, June, 1887.	Smart, June, 1887.	Smart, July, 1888.	Mallet, June, 1887.	Bailey, June, 1887.	Croton Water.
Solids, Volatile	1.457	.874	1.166	.....	.....	.....
Solids, Fixed	3.789	4.081	4.372	.....	.....	.....
Solids, Total	5.246	4.955	5.538	5.0604	5.424	6.395
Soda	....	....	....	present	.....	0.326
Potassa	....	....	....	"	.....	0.097
Lime	....	....	....	"	.....	0.988
Magnesia	....	....	....	"	.....	0.524
Iron	....	....	....	"	.....	.....
Iron Carbonate	....	....	....	"	present	.....
Sulphates	....	....	....	"	none	(SO^3) .322
Phosphates	....	....	....	traces	.....	.....
Chlorine	.1265	.1224	.1457	.1049	none	0.243
Carbonic Acid	....	....	....	present	.....	2.604
Silica (Sand)	little	little	...	little	present	0.621
Nitrous Acid (Nitrites)	.0000	.0000	.0000	.0000	.....	.....
Nitric Acid	.0032	.0023	.0023	faint trace	.....	.....
Ammonia, Free	.0012	.0000	.0006	.0014	.0009	.....
Ammonia, Albuminoid	.0009	.0006	.0006	.0031	.0014	.....
Organic and Volatile Matter	....	....	....	.....	.....	.670
Oxygen, from permang., consumed	.0000	.0000	.0000	.0420	.....	.....

Above is a table including the analyses of the water, together with an analysis (giving "*normal* impurities") of the Croton water of New York, the latter presented for the purposes of comparison. The names of the analysts have been already given. Each analysis is credited in the table to the proper person. To make them comparable and referable to a familiar standard the numbers have been reduced to grains in one United States gallon of the water, or, what is the same,

to parts per 58,328.88 parts of the water. In this I assume the water to be so near distilled water in purity that the error in the numbers will not be appreciable, certainly not material.

In the above analyses the solids are seen to occur in small quantity, less than 6 grains to the gallons. They are made up, more or less, of carbonates, sulphates, and chlorides, such as are common in drinking waters, the bases of the salts being soda, potassa, lime, magnesia, and iron. To these may be added silica, or sand. Professor Bailey makes the solids chiefly the carbonates of lime and iron, with silica, or sand, reporting the absence of sulphates and chlorides. Professor Mallet reports, in addition to the salts above, traces of phosphates and the absence of poisonous metals.

To the items in the table the following must be added as parts of Professor Mallet's analysis : nitrogen gas, almost no oxygen, organic carbon .0501 grain, and organic nitrogen .0163 grain.

Finally, from the facts in the case, the following conclusions, to my mind, are fully warranted :

1. The supply of artesian water at Memphis is practically inexhaustible. Such is the capacity of the water-bearing sand, and so enormous its area for gathering its store, I do not see how Memphis, in using profusely all she may need for years to come, can make an impression on the sea of supply below.

2. It is assured that there is no possibility of an admixture of the river or surface waters about Memphis, or of sewage fluids, with the waters of the artesian wells. The upward pressure from the wells, to a point even above high water of the Mississippi, gives this assurance.

3. The quality of the water for all city purposes has proved highly satisfactory. Its source is from a region boasting of its water, and from that it percolates through miles of sand, coming out as transparent as crystal and as sparkling as champagne, unaffected by washing rains or turbid streams. Its introduction was an epoch and a blessing to all concerned.

4. The system, lastly, for gathering and controlling the self-flowing water, and for sending it through the iron arteries of the city, is not only unique, but really grand in conception and execution. Honor to whom honor is due.—*Tennessee State Board of Health Bulletin.*

LONDON PAVEMENT.

THERE is one thing, and one only, proved beyond all dispute by the copious correspondence in the *Times* on the paving of London town. It is that every kind of pavement used is bad in the opinion of some, and has, indeed, vices not to be denied by the most friendly judge. Granite cubes, which had the name of paving all to themselves at one time, are excellent in their way ; but they are undeniably and horribly noisy. It is hard to say whether continuous traffic or the occasional tradesman's cart gets the most insufferable din out of them. Continuous traffic produces a continuous roar, in which you cannot hear yourself, or, what is less important, other people, speak. On the other hand, the stray tradesman's cart or hansom on granite paving is excruciating. No amount of experience can harden a man to the rattle tearing the surrounding quiet, or enable him to bear without anguish the dreadful shock produced by a sudden change from macadam to granite pavement. Macadam is less ear-piercing and much nicer to drive on ; but it undeniably has the great fault of being insufferably dusty in hot weather. As for its muddiness, of which many complain, we deny at once that it is as bad as wood. It is, however, hardly worth while to discuss the respective merits of these two methods. They are both fallen into great unpopularity, and the choice is supposed to lie between asphalt and wood. Nobody has a word to say for iron, which was once tried on a small piece of King Street, Westminster. The experiment was a rare thing of its kind, for it was sufficient. Nobody who can remember what that iron pavement became in muddy weather has any wish to see any more of it.

As for asphalt and wood, concerning which there is so lively a battle, there is a great deal to be said, and a great deal is said, on both sides. Asphalt is excellent when it is new, when it is good, when it has been well laid down, when it is quite dry or quite wet. In this ideal state it is smooth, wheels go easily over it, the hoofs of the hansom horse drawing the well-hung hansom at a smart trot go briskly over it

with an exhilarating tic-toc. But then it has to be very good and well laid, otherwise it blisters, makes bumps, cracks, and becomes detestable. However good it may be, it is odious when it is greasy—that is, when it is just going to be made wet, or is just beginning to get dry. Then it becomes an abomination to all who own horses, or have to drive them, or regard them with common humanity. Besides, it is unpleasant to the mere walker on his own legs. He tumbles, and sprains his ankle, or breaks his bones. Added to this, there is a particular form of light and easily distributed slush which collects on asphalt, and is sent flying in a spray by the mere approach of a wheel. There remains wood, which has many and fluent partisans. It has its merits, too. When it is fresh it is pleasant to drive over, smooth and silent; but it is a very bad pavement all the same. When it is greasy it is no better, or even worse, than asphalt for man and horse. When it is dry it emits a nasty penetrating dust, not so overpowering as the clouds which fly from macadam, but far more treacherous, ruinous to the eyes, and offensive to the nose of man. Its mud is adhesive and utterly filthy. Besides, it is always getting out of order, and when it has formed holes it is as trying to drive over as the ruts of an ill country road. Its partisans, indeed, reply that it has never had a fair chance. Sir Robert Rawlinson writes to the *Times* at imposing length to explain how it ought to be managed. We gather from him that the making of a decent wood pavement would be a species of artistic work in mosaic. A most carefully prepared foundation, flat as a billiard-table; on that, nine or twelve inches of concrete, which must be left to dry during weeks (how convenient it would be to have the Strand or Cheapside up for weeks!), on that a veneer of blocks, all put on their ends, with the grain in the proper direction and tucked in with felt —this is what Sir Robert Rawlinson says a wood pavement should be. He does not add, but others do, that it will first be necessary to construct a subway to allow the gas and water-pipes to be got at when they require mending, since it would be maddening to have his concrete, and so forth, torn up. Even, however, when all this has been done, the veneer will require continual replacing, which will do quite well enough to stop the traffic. Of all the schemes proposed, we really

think that Sir Robert Rawlinson's comes nearest to being a counsel of perfection. Granite, macadam, and asphalt can be laid down by a mere human contractor; but his roads would have to be made with the perfection of Mr. Giuliano's jewelry; and that is a touch above most road-makers we have met. It would also be pleasing to learn what Sir Robert's roads and their subways would cost. There are some three thousand miles of London street. On the whole, we are afraid there is nothing for it but to bear the ills we know of with philosophy. —*Saturday Review.*

RECENT RESEARCHES RELATING TO THE ETIOLOGY OF YELLOW-FEVER.*

By GEORGE M. STERNBERG, Major and Surgeon U. S. Army.

THE investigation in which I am engaged under instructions from the President of the United States and in pursuance of authority of an act of Congress approved March 3d, 1887, "making appropriations for sundry civil expenses of the Government," is not yet completed. The cultures which I have brought with me from Havana will require further study, and extended comparative researches will be necessary before a definite conclusion can be reached as to the specific etiological relation of one or the other of the micro organisms which I have obtained from yellow-fever cadavers, principally from the intestine. Owing to the facts mentioned and the limited time at my disposal I can only give a brief general statement of the present status of the inquiry in which I am engaged and of the methods of research which have been employed. But in my final report a detailed account will be given of the various micro organisms encountered and of the numerous experiments made upon the lower animals. Having remained in Havana from the middle of March until the first of September of the present year, I have had ample opportunity to obtain all the material necessary for a thorough research by

* Abstract of Address before the American Public Health Association, Brooklyn, N. Y., October 23d, 1889.

modern culture methods. Thirty autopsies have been made in typical cases of yellow-fever, most of which occurred among the Spanish soldiers admitted to the military hospital in that city. My cultures have been made for the most part in flesh peptone gelatine and in agaragar jelly containing 5 per cent of glycerine ; numerous cultures have also been made in sterilized blood serum, in veal broth, and in agua coco. The last-mentioned medium I used to some extent during my visit to Havana in 1879 as a member of the Yellow-Fever Commission of the National Board of Health. During the past summer I have used it extensively, and find it to be an extremely valuable culture medium, which is as transparent as water, and yet contains a large amount of nutritive material. It has a specific gravity of 10.20 to 10.25, a slightly acid reaction, and contains in solution a considerable amount of glucose. Both aërobic and anaërobic cultures have been made in the various media mentioned, into which have been introduced blood obtained from one of the cavities of the heart, material from the interior of the liver, the spleen, and the kidney, urine drawn through the walls of the bladder and material from the stomach and intestine. A method which has also been pursued in the entire series of cases consists in the preservation of a piece of liver or kidney, the size of a man's fist, in an antiseptic wrapping, by which the exterior is surely sterilized and the entrance of germs from without is guarded against. Such a piece kept in the laboratory for forty-eight hours, as a rule, preserved its fresh appearance and had no odor, but upon cutting into it it was found to contain numerous and various micro organisms. The cut surface had a decidedly acid reaction. The micro organisms found under these circumstances were bacilli of various species, and corresponding with those found in the contents of the intestine. They have been isolated by the use of Esmarch tubes and carefully studied. Possibly one or the other of them may be the veritable yellow-fever germ, but up to the present time no satisfactory evidence has been obtained that such is the case. The bacilli which have been found most constantly by this method are a large, motionless, anaërobic bacillus, resembling in its morphology the bacillus of malignant œdema. This is very commonly present, and is conspicuous by reason of its abundance and

dimensions. In my list of micro organisms encountered it is designated by the letter N ; the bacterium coli commune of Escherich, very common. A motile, non-liquefying bacillus, resembling bacterium coli commune in its morphology, but more pathogenic for rabbits and for guinea-pigs, a facultative anacrobic, very commonly present—my bacillus X. A short, motionless bacillus with stained ends, in chains, resembling the bacillus of babes, a facultative anacrobic, not pathogenic for rabbits or guinea-pigs, found in a limited number of cases only—my bacillus O. The presence of these various micro organisms in liver, obtained at an autopsy made soon after death and preserved in an antiseptic wrapping, may be taken as evidence that they were present in small numbers at the moment of death, but the examination of smear preparations made immediately after death, and culture experiments made at the same time show that they are not numerous, and in a considerable proportion of the cases the result of such immediate examination of the fresh liver tissue has been negative. It is an interesting fact that material from a piece of liver kept as described, and containing the micro organisms referred to, is very pathogenic for guinea-pigs when injected subcutaneously in small quantities, two to five minims, whereas the fresh liver tissue may be injected in considerable amount without producing any noticeable effect. This pathogenic power is due to the micro organisms present, and especially to my bacillus N and my bacillus X. Details of experiments will be given in my final report. Material from the intestine, also, which contains the same micro organism, is very pathogenic for guinea-pigs.

At the close of his address, Dr. Sternberg exhibited upon the screen photo-micrographs of the bacilli referred to, and also of the various micro organisms which have been claimed to be the specific germ of yellow-fever—viz. : The micrococcus of Dr. Domingos Freire, of Brazil ; his so-called cryptococcus xanthogenicus ; the tetragenus febris flavæ of Dr. Carlos Finlay, of Havana ; the liquefying bacillus of Dr. Paul Gibier—my bacillus G. And said with reference to the micrococcus of Freire : " I have not encountered it in any of my cultures from the blood and tissues of yellow-fever cadavers, and my extended observations fail to give the slightest support to his

claim. The yellow-fever germ of my friend, Dr. Carlos Finlay, of Havana, which I have named micrococcus tetragenus versitilis, is one of the most common atmospheric organisms in the city of Havana. I have frequently obtained it in cultures made from the surface of the body of patients in the hospitals in that city, and also in Vera Cruz, but it is not present, unless by rare exception, in the blood and tissues of yellow-fever patients. The liquefying bacillus which Dr. Paul Gibier isolated from the intestine in a limited number of cases, I have also obtained from the same source in about one third of my autopsies, but it is not constant, and when present is not abundant. I see no good reason for supposing that it is the specific infectious agent in the disease under consideration."

LIGHT IN THE SICK-ROOM.

Dr. B. W. Richardson, in the course of a Lecture on "Disease, and How to Combat it," remarks as follows:

Still a custom prevails, despite all our sanitary teachings, that the occupant of the sick-room in the private house should be kept at all hours in a darkened room. Not one time in ten do we enter a sick-room in the daytime to find it blessed with the light of the sun. Almost invariably, before we can get a look at the face of the patient, we are obliged to request that the blinds may be drawn up, in order that the rays of a much greater healer than the most able physician can ever hope to be may be admitted. Too often the compliance with this request reveals a condition of room which, in a state of darkness, is almost inevitably one of disorder everywhere; foods, medicines, furniture, bedding misplaced; dust and stray leavings in all directions.

In brief, there is nothing so bad as a dark sick-room; it is as if the attendants were anticipating the death of the patient; and, if the reason for it be asked, the answer is as inconsistent as the act. The reason usually offered is that the patient cannot bear the light; as though the light could not be cut off from the patient by a curtain or screen, and as though to darken one part of the room it were necessary to darken the whole of it. The real reason is an old superstitious practice,

which once prevailed so intensely that the sick, suffering from the most terrible diseases, small-pox, for instance, were shut up in darkness, their beds surrounded with red curtains, during the whole of their illness. The red curtains are now pretty nearly given up, but the darkness is still accredited with some mysterious curative virtue.

A more injurious practice really could not be maintained than that of darkness in the sick-room. It is not only that dirt and disorder are results of darkness, a great remedy is lost. Sunlight is the remedy lost, and the loss is momentous. Sunlight diffused through a room warms and clarifies the air. It has a direct influence on the minute organic poisons, a distinctive influence which is most precious, and it has a cheerful effect upon the mind. The sick should never be gloomy, and in the presence of the light the shadows of gloom fly away. Happily the hospital ward, notwithstanding its many defects, and it has many, is so far favored that it is blessed with the light of the sun whenever the sun shines. In private practice the same remedy ought to be extended to the patients of the household, and the first words of the physician or surgeon on entering the dark sick-room, should be the dying words of Goethe, "More light, more light!"

EARLY RISING AND LONGEVITY.

PROFESSOR HUMPHRY'S recent Collective Investigation Report on Aged Persons, contains some very positive evidence on a matter which has already engaged the attention of moralists as well as physicians. "The opportunity for nutrition to do its restorative work was in nearly all provided by the faculty of 'good sleeping,' to which was commonly added its appropriate attendant, the habit of 'early rising.'" Thus there is a relation between early rising and longevity. No doubt many people will hastily seize upon the sentence just quoted, and employ it in edifying lectures or essays for the perusal of youth, or embody it in popular medical works. Important qualifications follow in Dr. Humphry's report, but

they are likely to be overlooked. Doubtless the habit of early rising is, in itself, healthy ; most of all, it is a good sign of health when it evidently signifies rapid recovery from fatigue. Again, it usually denotes a strong will, the gift, as a rule, of a good physical constitution, or at least the safeguard of average bodily strength. Late risers are generally either invalids or persons of bad habits, idlers who are never free from other vices besides idleness. The nervous exhaustion which keeps a man wakeful throughout the small hours produces sleep late in the morning. This exhaustion is invariably due to one of several life-shortening influences, especially anxiety or indiscretion in diet or drink. Early rising is thus rather one effect of certain favorable influences, another result of which is longevity, than a cause of longevity. To turn a weakly man out of bed every morning at seven o'clock will not prolong his life. It will be noted that by "good sleeping" Professor Humphry signifies quick sleeping, "that is, the reparative work which has to be done in sleep is done briskly and well." Here, again, we have an effect of a cause ; but preventing a weakly subject from sleeping more than four or five hours nightly would not cause him to live long, but would rather tend to shorten his life. Equally important are Professor Humphry's observations which show that by "early" he does not entirely mean the time by the clock. The word "has a relative significance with reference to the time of going to bed. A person who retires to rest four hours after midnight and gets up at 10 A.M. may be strictly regarded as an 'early riser.'" Thus, early rising is synonymous in long life histories, with short sleeping, which means rapid recovery from fatigue, a sign of bodily strength. These scientific facts in no wise contradict the alleged value of early rising as a practice to be cultivated by all persons in good health. It is excellent as moral discipline, and eminently healthy as a matter of fact. Most persons will eat three meals daily. When a man gets up late those meals will probably follow each other at too short interval to be wholesome. When he is an early riser it will probably be otherwise. He can enjoy a good breakfast, and by the time for his lunch or mid-day dinner he will have an honest appetite again.—*British Medical Journal.*

VITAL AND MEDICAL STATISTICS.*

By John S. Billings, M.D., U. S. Army.

The term "expectation of life" is used by different writers in different senses, and hence has often given rise to confusion and misunderstanding. It should be used only in the sense of the mean after-lifetime—that is, the average number of years which persons at any given age, in a given place, may expect to live. In a stationary population, where there is no migration, and where the births are exactly equal in number to the deaths, the expectation of life at any age would be found by dividing the sum of the number of years which the whole population lived after that age by the number actually living at that age.

The term "expectation of life" is often confused with the "probable duration of life," which is the age at which a certain number of newborn children will be reduced one half, so that for any one of these children it is an equal chance as to whether it will die before or after that age. The difference between the probable duration of life and the expectation of life may be understood from the following example: Suppose that of 100 children born, 30 live one year, 20 live five years, 30 live forty years, and 20 live sixty years. Then the probable duration of life is five years, because at the end of five years just one half of these children will be dead; so that at the beginning it is an even chance for any one child as to whether it will die before or after the age of five years. But the expectation of life of any one of these children is 25.3 years, because these 100 children will, in all, live 25,300 years of life. In like manner, if 10 of these children were to die at the end of every five years, the probable duration of life would be 25 years, and the expectation of life would be 27.5.

Another phrase sometimes used in vital statistics is "specific intensity of life." This is the quotient of the dividend of the

* Abstract of the Cartwright Lectures, delivered before the Alumni Association of the College of Physicians of New York, November, 1889. Lecture II.

number of persons living at any age by the number dying at that age—that is, $\frac{Px}{Dx}$, being the reverse of the ordinary mortality ratio.

The chief source of error in an approximate life table constructed directly from the census figures and a registration of deaths, without correction or adjustment, is due to the fact that there is a very considerable error in the number given of the living population in the first six or seven years of life. Usually the census figures show that the number of children two years old is greater than the number one year old, and that the number four years old is greater than the number two years old, owing to a tendency to report erroneously a child at these ages as being older than it is. If we undertake to adjust or correct these figures so as truly to represent the number living at each year, we usually have to make some assumptions as to the law governing the mortality, or as to what is sometimes called the "law of life." This expression—the law of life—refers to the hypothesis that variations in mortality at successive ages take place in regular succession which may be geometrically represented by a curve, and that, therefore, if we know the mortality at certain ages in a given community, we can, if we know this curve, and if the number of observations were sufficient, deduce the mortality at other ages. Numerous formulas have been proposed for this purpose, from that of De Moivre in 1727, which is $Y = 86 - x$, x being the age and Y the corresponding number of the living, to the latest and most generally accepted formula of Gompertz, as modified by Mr. Makeham. This last is based on the assumption that a person's power of resisting death decreases as his years increase, so that at the end of infinitely small periods of time he loses infinitely small portions of his remaining power to resist destruction, death being considered as the consequence of two generally existing causes—the one a progressive, necessary deterioration, the other chance. If, for instance, there were a number of diseases to which young and old were equally liable and which were equally destructive at any age, the number of deaths among the young and the old by such diseases would evidently be in the proportion of the number of the young to that of the old. If there were no

other causes of death but these diseases, the number of living and dying would decrease in a geometrical progression as the age increases. But if the liability to death is constantly increasing in a given ratio as the man grows older, then the number of the living will decrease in a greater ratio than a geometrical progression would indicate.

This line of human life—which in some respects is not un like the line in the palm of the human hand, which the ancient teachers of cheiroscopy also called the line of life—is that of the healthy and normal individual. Many persons do not at any time possess the amount of vital force which it represents ; many infants at birth have but the capacity for a few hours or a few days of existence. Some men begin to grow old at forty ; the atheromatous degeneration invades their arteries, the heart becomes fatty, and at fifty they are in extreme old age as regards the processes of retrograde metamorphosis and the ability to resist death. Calculations and corrections based on such formulæ as these give interesting results and are useful to life-insurance work, but they are unnecessary to the purposes of the sanitary statistician. Even the fundamental hypothesis upon which Gompertz's law is based—that the proportion of deaths at a given age is constant—is always untrue for any given age, as the prevalence of infectious and contagious diseases of various kinds, and of various lethality, varies with different years ; and for this reason it is desirable to have the records of deaths for a considerable period of time —at least three years, and, better, ten to twenty years—in order to correct these variations.

It is impossible to calculate a life table for the United States as a whole, for we have no accurate information as to the total number of deaths occurring in any given period of time in the United States, and still less as to the number of deaths occurring at each group of ages. But even if such a table could be prepared, it would be of very little interest or use, for the conditions of the various sections of the country as to climate, occupations, prevailing diseases, character of inhabitants, etc., are so widely diverse that the average or mean would scarcely be applicable anywhere. The most useful life tables for sanitary purposes are those which relate to certain circumscribed localities, such as a single city, or even a single ward of a city ;

but for scientific and medical purposes the most useful are those which relate to particular classes of people, particular occupations, etc. There is a special difficulty in preparing an accurate life table for a city, due to the effect of migration into and out of the city from and to the surrounding country, which disturbs very much the rates of death at different ages. The mortality in a great city is almost always reported as less than that which the actually existing causes of death and disease tend to produce, because domestic servants, shop-girls, and others who have come from the country, go back to their rural homes when their health begins to fail after a year or two of city life, and there die. This is especially the case in regard to deaths from consumption and diseases of that class. The groups of ages which are thus specially affected are those between fifteen and twenty-five years ; and, therefore, the mortality at this group of ages in the large cities, as calculated from the number of deaths, is too small to represent properly the causes of death acting on the population at those ages. On the other hand, the mortality at the same ages in the rural districts near the city will be correspondingly unduly increased.

The data necessary for the construction of life tables are comparatively rarely available for the purposes of the sanitarian. Hence, while admitting that these furnish the only true measure of public health, registrars of vital statistics and sanitarians have sought for other standards for such measurement, the data for which could be more readily obtained and more easily applied. Especially has the search been made for some means of measuring sanitary conditions and progress from the data furnished by deaths alone, without reference to population. One of the most common of these is the use of the period of infancy from 0 to 5 years, by comparing the number of deaths at this period with the total number of deaths. It is very certain that the period of infancy gives the most sensitive test of sanitary conditions ; but the comparison must be made, not with the total number of deaths at all ages, but with the number of the living population furnishing such deaths.

Another method, which we can only use for a census year, is the use of the ratio which exists between the total number of births during the year and the number dying during the

year out of this number of births. This is not the same as taking the total number of those dying under one year of age. For example, in the city of Brooklyn during the last census year there were 8805 births, and of these 1408 died, leaving on the date of the census 7397 living children under one year of age, putting aside the effects of migration ; but the total number of deaths of white male children under one year of age in Brooklyn was 2059 ; hence, 159.9 per 1000 of those born within the year died within the year, while the deaths of children under one year were 278.4 per 1000 living at the end of the year, with a still higher rate for the year.

The test of sanitary condition which is most generally employed in this country is the proportion of the number of deaths which occur in children under five years of age to the whole number of deaths reported. This does fairly well in comparing the rates of the same city, in which it may be presumed that the general ratio of age distribution is nearly uniform at different times, but it is a very fallacious method of comparing rates of different cities or localities.

Much the same may be said of comparison of deaths at a given age-group to total number of deaths, which is apt to give very misleading conclusions. For example, suppose in a given city the total number of deaths of children under five years of age was 30 per cent of the total deaths, while in a given class of people in the same city they were only 10 per cent of the total deaths. It would be by no means safe to infer that this special class was in a better sanitary condition, because among the poorer classes the proportion of children is always relatively large, which implies a large population exposed to these special diseases, and, consequently, a larger number of deaths under five years of age, without reference to the sanitary condition.

Another test which has been proposed is that of the mean age at death, which is the quotient of the sum of the ages of different individuals at death, divided by the total number of deaths. This is only useful in comparing the conditions of two populations when the age and sex constitutions of these populations are the same. It is out of the question to apply the test to different occupations, as, for example, to compare the mean age at death of major-generals with that of second

lieutenants. The chief use of this test is in its application to different causes of death, but even for this purpose the death-rate in relation to population is much better.

A considerable part of the errors to which one is liable in comparing the mean age of different occupations at death may be avoided by excluding from the computation all deaths of children under five years of age.

Although the expectation of life, or mean after-lifetime, is the standard of comparison almost universally accepted by statisticians, it is, in some respects, not a very satisfactory one, since it is often misunderstood by the public, which is apt to use the word "mean" in the sense of usual or ordinary —that which occurs most frequently. But the ordinary life-time, or, as Bertillon calls it, the *vie normal*, is a very different matter. After the perils of childhood are passed the greatest number of deaths cluster about the age-period of seventy years, and the popular phrase here would be that it was a premature death which occurred in a man under sixty years of age.

The great majority of the mortality statistics prior to the present century are necessarily incorrect and unreliable, because they are based, for the most part, on the data of deaths alone. The deaths can only be taken as a measure of probable duration of life for any community when the births and deaths are equal and there is no migration, a state of matters which must very rarely happen and be of very brief existence.

Among the many expedients which used to be employed for estimating population was that of multiplying the number of living in which one death was supposed to occur, by the number of deaths. That is to say, by guessing at a factor which could only be ascertained by comparing the annual deaths with the number living. Take, for example, the estimates of the population in London made by Graunt in 1662, on the basis of one death occurring out of every 32 living, which made the population to be 403,000. In 1683, Petty, taking the mortality to be 1 to 30 persons living, made the population to be 669,930.

One peculiar thing about this method is, that it is liable to make the population seem the largest at those periods when it was in reality the smallest; for when the number of deaths

was unusually large by reason of an epidemic, which would actually lessen the number living, it would show an apparent increase in the population for the same period.

It may, perhaps, be asked why it is, if the nature of the data which are required to make mortality statistics reliable and satisfactory is so well known, that more of them are not provided by the municipal and State officers charged with the registration of vital statistics. For example, New York City has a very perfect system of registration of deaths, which is in competent hands and is well executed. Why, then, has New York City published no separate mortality report since 1883, and why, in the reports which it has published, does it not give the data with minuteness of grouping, so that we might know the number of deaths at each age, of each sex, and of each race and occupation in each ward from each cause of death, instead of giving, as it gave in its last report, the number of deaths from each of a few causes of death for each of a few groups of ages, and separately for each sex, and for natives of the United States, natives of foreign countries, and colored, to which is added a statement of the deaths from zymotic diseases in each ward?

In order to understand the answer to this it is necessary to have a clear conception of the difference in cost of tabulation and publication according to the mode of grouping of the data. If, for example, the deaths are given by 20 groups of ages and by sex and by color for each of the 24 wards, and for the city as a whole, it will require 49 columns to do this. If we make the distinction for, say, 100 different causes of death, allowing 50 lines to the page horizontally, and 20 columns vertically, giving 1000 places per page, we should get all this information for the city on 4 pages; but if we wish to show the number of cases of death from each cause at each group of ages, of each sex and each color in each ward, we shall have to have 2000 columns, which will make about 200 pages. If it be desired to estimate the influence of seasons in connection with all these things, we must have a similar table for each month, or 2400 pages large octavo.

Again, let us suppose that we wish to have the data fully presented in order to estimate the influence of occupation upon health. We will only ask for details of 100 occupations in males. But we should like to know the number of deaths

in each of these occupations for each of, say, 10 groups of ages, in each of at least 5 races, in the married and single, in each of 12 months, for each of the 24 wards, for each of, say, 100 different causes of death, giving 288,000,000 possible places, making 288,000 pages large octavo.

It is, of course, out of the question to present the data in any such detail as this, and it is therefore necessary to make a selection of combinations which will indicate the most interesting relations of the several points under discussion.

It is, however, often very difficult and even impossible to tell precisely what combinations it will be necessary to make to get at the probable explanation of an especially high or low death-rate in a given group ; and hence we sometimes have to make a very considerable number of tentative combinations and tabulations, from which we may select only a few as really throwing light on the matter, and therefore as worth publication.

When we have to tabulate data in such a way that the individual items are to be distributed through a thousand columns or more, and each of these to be summed up for different localities, a vast amount of clerical labor is required. For distributing in 1000 spaces the various items assigned in each death certificate, if it be done by the old-fashioned system of tallying on a large sheet, an expert clerk will not be able to tally off more than 1000 records of death per day ; so that for, say, 30,000 deaths, which is less than the average number of annual deaths in New York City for the last ten years, it would require the labor of a clerk thirty days to produce a single-page table—about one per cent of what is needed.

By the use of cards or slips, tallying machines, adding machines and sorting boxes of various kinds, this labor may be much reduced. One of the latest methods of doing this is by the use of cards of a uniform size in which holes punched in certain parts of the card correspond to the various divisions of locality, time of death, sex, age, occupation, cause of death, marital condition, etc. These cards may then be passed through a machine which registers on a series of dials such combinations of the data as the dials may be adjusted for, by means of electrical connections established between a metal plate below and a series of metal rods above, wherever there is a hole in the card.

Death-rates, even when derived from complete and accurate data and compiled in the most satisfactory manner in the form of life tables, necessarily give only an imperfect view of the prevalence of disease in a community, or of the relative amount of disability among the people, requiring extra labor by the productive class, due to the recurrence of sickness. Many forms of disease which render life more or less of a burden, and some of which totally disable the individual from earning his subsistence, seldom or never appear in the registers as a cause of death ; while even of those diseases which are reported as causes of a considerable proportion of deaths, we can rarely at present indicate any definite or certain relation between the number of cases of the disease and the number of deaths reported. For example, it is well known to all practising physicians that the mortality varies greatly in different epidemics of such diseases as scarlet-fever, measles, small-pox, whooping-cough, yellow-fever, etc., the variations appearing to depend principally upon the particular conditions of the environment as to temperature, moisture, winds, density of the population, etc., at the time of the outbreak, and also upon particular conditions of the specific virus or micro-organisms causing diseases of this kind.

Take, for example, the spread of yellow-fever in Texas and along the Gulf Coast during the year 1867. Here the specific cause of this disease appears to have entered the United States by two distinct routes, one coming from Vera Cruz, Mexico, and the other coming from the usual source, Havana. At that time the United States had a comparatively large number of troops along the southern border of the country, and hence we have a series of returns showing not merely the number of deaths but also the number of cases of sickness from this disease occurring in a given population.

Now, in those places where the disease was of Mexican origin the cases were more fatal than those of Cuban origin, "two out of every five cases of the former dying, while the mortality of the latter was only two out of seven. The ratio of deaths was 400 per 1000 cases for the first of these groups, 284 per 1000 for the second." *

* War Department, Surgeon-General's Office, Washington, 1886 ; Circular No. 1, p. xviii.

For the great majority of diseases it is not possible to obtain statistics as to their prevalence among a general population. The only sources to which we can look for information of this kind are the records of the Army and Navy, of the police force in certain cities, of the employés of railroads, and of the members of certain societies having insurance against sickness. The records of the Army and Navy are especially valuable in this point of view, but they relate only to males of certain groups of ages and of a carefully selected class of population.

In the last United States Census an attempt was made to obtain on the schedules of the living population the number of those who on the first day of June, 1880, were so sick or disabled as to be unable to pursue their ordinary occupations. This was the first attempt of the kind which has been made in this country, but similar attempts were made in two censuses in Ireland, in a census of the Australian Colonies, and in a census of Hungary.

The first examination of the United States schedules seemed to show that the returns of the sick were too imperfect and too inaccurate to permit of drawing any conclusions from them. But subsequently it turned out that they were really more complete than had been supposed, and a sufficient number were compiled for different parts of the country to obtain a fair sample of the general results. This compilation showed that for the total population over fifteen years of age the number found sick out of every 1000 living varied from 7.17 to 22.7 for males, and from 8.1 to 17.5 for females, or about $1\frac{1}{8}$ per cent of males and $1\frac{1}{5}$ per cent of females. These do not include the blind, deaf and dumb, insane, and idiots, and it is probable that the figures do represent very fairly the different proportions of sickness occurring in males and females and in certain groups of ages at the time the Census was taken, which, it must be remembered, was at a period when there is probably the least amount of sickness and disability among adults.

From the results of data derived from mutual benefit societies in England, it has been estimated that for every case of death in a community there are two persons constantly sick; that is to say, there is an average of two years' sickness to each death,

or that, if the annual death-rate is 18 per 1000, the average number constantly sick is about 36 per 1000.

Mr. T. R. Edwards (London *Lancet*, 1835–36, i. p. 855), from the study of a series of returns from friendly assurance societies, claimed that, for large numbers of people, there is a constant ratio of sickness peculiar to each age, and that the duration of each case of sickness at any age is in proportion to the mortality at that age. His theory is that the mortality at any year of age exceeds that of the preceding year by 2.999 per cent, or that the mortality during any decennial interval of age exceeds that of the preceding decennial by one-third part; or that the mortality rate doubles in twenty-three and a half years.

According to his theory, if a physician loses by death double the proportion of patients at the age of forty-three that he does at the age of twenty, the effect of his remedies in each case is the same.

By the Census reports the proportion of sick to 1000 of population of different ages was as follows:

Age.	Males.	Females.
15 to 25	6.9	6.8
25 to 35	8.6	9.7
35 to 45	12.2	11.5
45 to 55	16.8	14.4
55 to 65	25.5	20.4
65 and over	44.5	35.3

This corresponds in a general way to the conclusions of Mr. A. G. Finlayson relative to the amount of sickness in members of friendly societies, printed in 1854.*

He found that taking the whole mass of male members of friendly societies from the age of fifteen to that of eighty-five, about five years of sickness occur to each man during this seventy years; but during the period of labor from the commencement of the sixteenth year of age to the close of the sixty-sixth, there are in this fifty-one years but seventy-eight weeks of sickness, or about one and a half weeks per annum; and the sickness occurring from forty-two to sixty-six is almost

* See *Insurance Cyclopædia*, vol. v., p. 83.

double that occurring in the first half from fifteen to forty-one. Hence he concludes that the sickness of the first twenty-five years of working life is almost exactly one-half that of the second twenty-five years. In the class devoted to heavy labor the sickness is almost a year more, or in the proportion of eleven to nine as compared with the sickness undergone in the class engaged in light labor.

It is also to be observed that during the early years of life —say from twenty-one to forty-one—the number of persons withdrawing or excluded from such societies is very large, being nearly five times the number of deaths. As the age of the members increases the departures become fewer, because it becomes more of an object to remain connected with the society, since the rate of annual payments is the same for all ages, while the proportion of sickness steadily increases, as we have seen, with advancing age.

Several attempts have been made to induce physicians to keep a record of all the cases they treat, but with very little result, and it is very improbable that anything like complete returns of sickness will ever be obtained for any large body of the civil population. Such registration will always be confined to infectious and spreading diseases ; in other words, those which are known or supposed to be preventable. In order to make a registration of this kind of any great practical value it must be continuous and compulsory. The plan of endeavoring to get the medical men of a locality to contribute voluntarily this information, even when accompanied by the offer of the payment of a fee, has produced partial and incomplete results, which become more and more incomplete as time goes on and the first enthusiasm in favor of the new plan dies away.

The various systems of compulsory notification which have been tried are, first, to require the medical attendant only to furnish the returns to the Health Office ; second, to require the householder or head of the family to make such returns ; third, to require both the doctor and the householder to make such returns ; and fourth, to require the doctor to certify to the householder and the latter to notify the health authorities.

On the part of some members of the medical profession, both in Great Britain and in this country, strong objections are urged against compulsory notification of disease, and, espe-

cially, against that form which requires the doctor to furnish such notification direct to the sanitary authorities. It is urged that such notification is a violation of professional secrecy; that it leads to concealment of disease and to the refraining from calling in a medical attendant, and that it tends to throw the treatment of such cases into the hands of a lower class of practitioners, who are willing to run the risks of violation of the law, or even to make false returns for the sake of securing an increased practice. There is, however, little difficulty in keeping the information furnished strictly confidential, provided the health officer is a man of tact and discretion, and provided, also, that the press does not insist upon being too inquisitive with regard to matters of this kind.

Any system of compulsory notification, however, which has to be continuously successful, involves two things: First, that the health officer shall not be in any way engaged in or connected with private practice; so as to do away with all reluctance on the part of general practitioners reporting their private cases.

The second is, that to obtain any benefit from notification, special hospital accommodations for such forms of diseases as are reported must be provided by the community, and there must be a power of compulsory removal of patients to such hospitals in certain cases.

Undoubtedly, valuable statistical data might be obtained by the simple notification alone; but the desire to obtain statistical information will never be accepted as a sufficient ground for legislation requiring compulsory notification.

We hear very much in recent years of the proportion of deaths from zymotic diseases as a test of the salubrity or sanitary condition of a place; but as there is no general agreement as to what is and what is not a zymotic disease, and as the term rests on a theory of causation of disease which is now definitely abandoned, it should no longer be made use of. It is much better to select the mortality from certain forms of disease, and specify these, in order that we may know exactly what we are talking about and be sure that the matters compared between the two localities are the same. English health officers often use the term "seven principal zymotic diseases," by which they mean small-pox, measles, scarlet-fever, diph-

theria, whooping-cough, typhus-fever, and enteric-fever. If this is the selection it is not a good one, for it omits the diarrhœal diseases. Forty years ago, near the commencement of the speculations of Dr. Farr and Mr. Simon as to the causation of disease, nearly all of the contagious diseases were grouped together as zymotic diseases and were supposed to be more or less connected with filth. At present we know that the cleanliness of the surroundings has little or nothing to do with the prevalence of small-pox, measles, scarlet-fever, or whooping-cough ; so that these, which are typical zymotic diseases, are of very little interest in connection with the question as to local causes of diseases in a place connected with uncleanliness, and to be remedied by sanitary effort.

Their relative prevalence, and the mortality due to them, are of interest in a totally different connection, and their separation involves an entirely different field of sanitary work. Such diseases as phthisis, diphtheria, and the various forms of diarrhœal disease, including cholera infantum, or the summer diarrhœa of children, of England, are of especial interest as regards the field of local sanitary work in relation to sewerage, drainage, and cleanliness.

The influence of habitation upon death-rates and on the prevalence of certain forms of disease is indicated by statistics given by Dr. Korosi * for the city of Buda-Pesth, where the deaths are reported with the following classification, viz. :

1. Persons in a habitation where, at most, two persons dwell in one room.

2. Persons dwelling where from two to five persons dwell in one room.

3. Where there are from five to ten in a room.

4. Where there are more than ten in a room.

The first class includes the rich and well-to-do. The others present increasing grades of overcrowding. Of each 10,000 deaths reported, 1941 belong to the first ; 5759 to the second ; 2167 to the third, and 133 to the fourth ; and these ratios may be used to compare with the proportions of deaths from any disease, or group of diseases, as occurring in the different classes.

* Korosi "Influence des Habitations sur les Causes des Décès," etc. Paris, 1877.

Comparisons thus made indicate that contagious diseases, with the exception of scarlatina and typhus, are more frequent and more fatal in the crowded houses, and that the same is true of congenital dibility and diarrhœa, while tuberculosis and pneumonia do not seem to be specifically influenced by this cause. (? !) As the figures of death in these categories are not comparable with those of the living population, the results have not much value.

Suppose, now, that we are studying the death-rates of a city for a series of years, in order to determine whether its sanitary condition is, upon the whole, improving; whether work which has been done in the way of introducing sewerage, or improved water-supply, or special precautions in dealing with contagious diseases, have had an evident good effect, and have produced results which are on the whole satisfactory in proportion to their cost. It is very evident that we must have something more than the mere gross death-rates for the whole population in order to form an intelligent opinion on these points. A gross death-rate may, it is true, give a correct answer to the question as to whether the sanitary condition is improving, but we can never be sure of the correctness of this answer until we have made detailed comparisons of the mortality by age and sex, and of that due to certain great classes of disease.

What has been the influence of modern civilization upon the average duration of human life—upon rate of increase of population—upon the average health and vitality of the races which it has affected? The present population of the world is between 1500 and 1600 millions, of which there are in Europe over 350 millions, and of European stock in other countries 100 millions—in all, say 450 millions, as against 150 millions in 1788. (See Giffen, "Jubilee Volume of Statistics," 1885, p. 99.)

Evidently the birth and death-rates now prevailing in Europe and the United States cannot have long continued, for if we suppose a population to double itself only once in a century, a million of people living 1200 years ago would have developed into a population of over 4000 millions by this time.

What, then, is the difference between the expectation of life in New York, at the present day, and that in European

cities one, three, five, ten, or twenty centuries ago? This question has been asked in various shapes many times, and many attempts have been made to answer it; the general conclusion being that there has been a very great increase in the average longevity of man in civilized countries not only within the last thousand years, but within the last century. Notwithstanding, it must be confessed that the statistical records bearing on this point are very incomplete, vague and unsatisfactory, and that it is only for the last forty or fifty years that we can speak with anything like scientific precision as to the amount of progress made.

So far as what is termed potential longevity, that is to say, the maximum duration of life possible in an individual of the race, is concerned, there is no evidence that this has changed for at least 2000 years, being, for man, generally taken as 100 years. You will remember the scriptural declaration that "the years of a man are threescore years and ten, and though by reason of strength they be fourscore years, yet is their strength labor and sorrow;" notwithstanding, there are sufficient records to prove that even in those days the potential longevity of man was as great as it is at present.

But when we come to the average longevity and expectation of life at birth, there is sufficient evidence to indicate that it has increased; but whether this is due to the preservation of more infant lives for a few years although they may still die before the productive period is reached, or to an increase of the number of those who live into and share the working period of life, is still uncertain, for this question can only be settled by comparative life tables, and I have already explained that we have no reliable life tables that are much over fifty years old.

I have already referred to the average duration of life among the better class of Roman citizens, as fixed by Ulpian, being equal to thirty years. Among the oldest data which we possess, from which we can attempt to compare death-rates of past centuries with those of the present, are the records * of Geneva in Switzerland, which date from 1551. The average annual death-rate per 1000 was as follows:

* Malet, "Annales d'Hygiène, 1837," vol. xvii., p. 5.

From 1551 to 1600..... 40
" 1601 to 1650..... 37
" 1651 to 1700..... 35
" 1701 to 1750..... 33
" 1751 to 1800..... 29

From 1801 to 1813 the mean duration of life was thirty-six years and six months.

From this, the probable duration of life is given as follows :

Periods.	Probable duration of life.			Proportionate increase.
	Years.	Months.	Days.	
End of the 16th century..	8	7	20	100
17th century	13	3	16	153
1701 to 1750.....	27	9	13	321
1751 to 1800.....	31	3	5	361
1801 to 1813.....	40	8	0	470
1814 to 1833.....	45	0	29	521

The figures are not sufficiently full or accurate to justify the conclusion that the probable duration of life in this place has been increased five times in three centuries, but they do indicate a very marked and progressive increase.

In the sixteenth and seventeenth centuries Geneva had a small population, frequently exposed to fatal pestilence, and produced a comparatively large number of infants, of whom but a very small proportion reached the age of puberty. In the early part of the eighteenth century the average mortality of all European countries, taking towns and villages together, is estimated by Sussmilch as 1 in 30, or 27.778 per 1000.

The most important contributions to our knowledge of the increase in the duration of life in recent years is contained in a paper on "The Decline in the English Death-rate," by Noel Humphreys, published in the *Journal of the Statistical Society* in 1883 : and in a report by Dr. William Ogle in a supplement to the Forty-fifth Annual Report of the Registrar-General of England, published in 1885.

The conclusions, as based upon English life tables, comparing periods from 1838 to 1854, and from 1871 to 1880, are as follows :

The mean after-lifetime of a male at birth was for the first period 35.91 years, for the second 41.35, showing an average

gain of nearly a year and a half. The mean after-lifetime continues longer in the second period than in the first for each year of life until the nineteenth. At the close of the nineteenth year the expectation of life was exactly the same in each period, viz., 40.17 years. From that time onward the after-lifetime is shorter in the recent period than in the older one ; that is to say, the individual male in England lives on an average a shorter time after he is nineteen years old than he did forty years ago ; but the number of males, out of equal numbers at the start, who survive to live these shorter lives, is very much greater than it was formerly, so that the aggregate life of the whole is considerably increased. The gain is greater in females than in males. Thus, in the first period, the expectation of life in females was 41.85, while in the second period it was 44.62, being a gain of 2.77 years, on an average, for each female. The after-lifetime continues longer in the new period down to the completion of the forty-fifth year, when the expectation of life becomes the same, viz., 24.06.

Taking a million males and a million females the following table shows the additional years gained at each age-group, for each sex, during the recent period :

Age-periods.	Males.	Females.
0 to 15	255,340	288,226
15 to 25	281,872	339,933
25 to 35	344,906	453,221
35 to 45	310,746	490,471
45 to 55	211,040	474,009
55 to 65	86,920	385,257
65 to 75	10,464	239,617
75 to 85	27,770	82,568
85 and upward	13,451	8,282
Total years gained	1,439,139	2,777,584

This table plainly shows how erroneous is the conclusion sometimes drawn that because the death-rates have fallen only in the earlier age-periods, while they have risen in the later age-periods, the aggregate gain to the community from the changes is confined to the unproductive years of life. We may fairly take the period which intervenes between twenty-

five and sixty-five years of age to be the most valuable part of life, and of the aggregate years saved, 66 per cent in the case of males and 65 per cent in the case of females are lived in this period.

The earliest attempt to give vital statistics for the United States is probably a paper by Edward Wigglesworth, published in the "Memoirs of the American Academy of Arts and Sciences," 1793, vol. ii., page 131, entitled, "A table showing the probability of the duration, the decrement, and the expectation of life, in the States of Massachusetts and New Hampshire, formed from sixty-two bills of mortality on the files of the American Academy of Arts and Sciences, in the year 1789." The whole number of deaths reported on these bills was 4893. He had no data of population, but the reports indicated that the births in the locality sending the bills were twice as many as the deaths. As his calculations are based solely on the deaths alone at certain ages, the conclusions are evidently entirely unreliable.

Another paper is by J. E. Worcester, printed in the "Memoirs of the American Academy of Arts and Sciences," Philadelphia, 1833, vol. i., new series, page 1, and entitled "Remarks on longevity and the expectation of life in the United States, relating more particularly to the State of New Hampshire." Taking the bills of mortality of thirty-two townships in New Hampshire, for an average length of time of twenty-one years, he found that the death-rate was 1 in 83, or 12.04 in 1000. He wisely remarks that the ratio is so small as to excite suspicion concerning the accuracy of the bills.

One of the most frequent fallacies in the use of statistical data is to mistake an effect or a coincidence for a cause. For example, it is common to speak of rapid growth in population of a locality or country, as if it were in itself a good and desirable thing, a cause of prosperity and well-being; and when this growth lessens or ceases we find some philosophers trying to devise ways and means to increase it. This, for example, has been the case in France for a number of years, and various plans have been proposed for increasing the birth-rate and diminishing the death-rate, in order to produce prosperity and strength in the country. The fact is, that rapid increase of population in a country is an indication that things are going

on well there ; that there is a demand for labor ; and that men find that they can increase their comfort by going, or staying, there. But it may, or may not, be a cause of prosperity at a given time, and sometimes it may cause hardship, weakness, and suffering.

You are all, no doubt, familiar with what is known as the Malthusian theory, which is, essentially, that population is limited by the means of subsistence available ; that population increases in a geometrical proportion, while the means of subsistence do not increase in a faster ratio than arithmetical progression ; that, therefore, the growth of population is checked by want of means of subsistence, and, therefore, that the increase of mankind may be considered as the chief source of misery, which misery, together with moral restraint to a limited extent, and vice, check the superior growth of population, keeping it at a level with the means of subsistence.

If this doctrine be applied to the lower animals, or to an extremely savage and ignorant set of men, it is very nearly correct ; for, in this case, the term "means of subsistence" applies almost exclusively to the natural produce of the earth. As soon, however, as man applies his intelligence to the increase of the means of subsistence by improvements in agriculture, by manufactures, etc., it is no longer true that the means of subsistence increase in an arithmetical proportion. They may increase, and for the last fifty years have, throughout civilized regions of the world, actually increased in a ratio more rapid than geometrical proportion, and more rapid than the increase of population ; and it is, therefore, substantially true that "the character of every race of men is the real limit to its numbers in the world, if allowance be made for accidents of position and time" (Farr, "Vital Statistics," London, 1885, p. 15).

The uneducated and unskilled laboring classes, who are without capital, when gathered together in large masses, tend constantly to illustrate the theory of Malthus by increasing faster than they can provide means of subsistence for themselves and their families.

But this tendency is opposed by the advance in knowledge, increase in energy, and improvement in inventions in the educated classes, who, although it may be said that they are

acting only from selfish interests, are, nevertheless, led by those interests to expand the fields of agriculture, manufactures, and commerce, and thus both to increase the means of subsistence and to lessen the price thereof.

Under favorable conditions a population is capable of doubling its number every 25 years. In the United States, between the years 1790 and 1860, the population doubled itself about once in 23½ years. But a proportion of this increase was due to immigration.

In estimating the progress of the population of the United States for the next century, if we assume a rate of 33.3 per cent of increase in ten years, which is a little less than the mean rate for the last century, we find that the probable population in 1990 will be 1,206,562,248, giving a density of population of 399 to the square mile, approaching the present density of China, which is 420, or of Belgium, which is 434 per square mile.

Whether in the future a systematic attempt to maintain an equilibrium between subsistence and population will become a practical problem of national policy, is, at present, a purely theoretical speculation, for it is very easy to show, as has been done by Mr. Atkinson, that the means of subsistence at present at our command can easily be quadrupled, as the increase of the population occurs both to require and produce such increase.

One of the most interesting and important questions in vital statistics in this country is that relating to the relative increase in the white and colored population in the Southern States, and the influence which has been, and will be, exerted upon this by the abolition of slavery. On the one hand, it is claimed that the large increase in the colored population between 1870 and 1880 indicates that in fifty, or at most a hundred, years more it will greatly predominate. On the other, it is affirmed that the greater increase of the colored population is apparent rather than real.

We have little information of value relative to the vital statistics of the colored population in the South, previous to the abolition of slavery. The only two Southern States having registration laws which were to any extent enforced were Kentucky and South Carolina. The Kentucky reports relating

to the registry and returns of births, marriages, and deaths are eight in number, commencing January 1st, 1852, and extending to December 31st, 1859, the last report being printed in the early part of 1861. The South Carolina annual reports of registration of births, deaths, and marriages begin with the year 1853 and end with the year 1859. In neither State was the registration of either births or deaths in any year sufficiently complete to permit of accurate comparisons with the number of living population, either for the whites or blacks.

The conclusions drawn by the registrars may be summed up in the statement that the birth-rate of the slaves was much greater than that of the whites in South Carolina, while the difference was not marked in Kentucky; that in both States the death-rate of the negro was decidedly greater than that of the whites, especially in infancy, and that the average age at death was decidedly higher in the whites.

I have already shown the fallacies connected with taking the average age at death as a means of judging either the healthfulness of a locality or the expectation of life. Notwithstanding, this is practically the only ratio to which we can refer in regard to the question under consideration.

The records of the statistics of 1880 show that the birth-rate for the year was greater in colored than in the whites, since in the ten groups in which distinction of color was made for this purpose, the birth-rate for the whites was 32 and for the colored 38.06 per 100 of aggregate population; or, for the whites, 127.1, and for the colored, 163.8 per 1000 of women between the ages of fifteen and forty-nine. The birth-rate is always higher among the poorer classes of a population, and it is doubtful whether the birth-rate of the negro is higher than that of the laboring classes among the whites. The mortality among the colored infants in the earlier months of life is much heavier than among the whites in the same localities. For example, in the ten grand groups just referred to, out of each 1000 infants born, the number which died under six years of age was, for the whites, 66.7, and for the colored, 71.4. This fact tends to increase the birth-rate among the colored, because, with the loss of the infant and the consequent cessation of nursing, the probabilities of a fresh pregnancy increase. The marked difference between the vital

statistics of the white and colored in the South is much greater in the cities than in the rural districts.

The average mortality in a population of a little over 43,000,000 whites, was recorded as 14.74 per 1000; while in a population of 6,752,000 colored, the recorded mortality was 17.28 per 1000. It is known that each of these recorded death-rates is much lower than the actual one, owing to failure to record the whole number of deaths occurring during the census year; but it is also known that the proportion of failures to record was decidedly greater among the colored than among the whites, and hence the difference between the death-rates of the two races is even greater than that indicated by these figures.

How far is this excessive mortality in the colored population due to race characteristics? Is it due to peculiar susceptibility on the part of the negro to certain distinctive forms of disease, or to his having less vital force and capacity to resist disease and death? Undoubtedly the great mass of the colored population is poor and ignorant, lives in the dampest and dirtiest parts of cities, and in the midst of unhealthy surroundings, and is in other respects unusually exposed to well-recognized causes of disease.

The statistics of 1880 show that the colored race is peculiarly liable to fatal results from certain forms of disease, especially consumption, pneumonia, diarrhœal diseases, affections of pregnancy, scrofula, and venereal diseases; and that, on the other hand, it is much less liable than the white race to fatal results from cancer, diphtheria, diseases of the nervous system, scarlet-fever, and suicide.

Notwithstanding the interest and importance of the question, we have, at present, no sufficient data to determine whether the negro, under the same circumstances as to poverty, etc., is or is not more prolific or short-lived than the whites, and absolutely no data of any value for determining the relative fecundity and mortality of the mixed bloods, including mulattoes, quadroons, octoroons, etc. An effort will be made in the coming census to supply this deficiency as far as possible. In the enumeration of the population, those of mixed blood will be recorded separate from the pure blacks and the pure whites, and an effort will be made to obtain cor-

responding records of death in order to determine the death-rates of these mixed bloods. An effort will also be made to determine the birth and death-rates of certain classes of poor and ignorant whites, such as the tenement-house population in our northern cities, as distinguished from those of the mass of the white population, which will give us a better means of comparison of the mortality of the two races, under comparatively similar circumstances, than we now have.

In studying the causes of disease and death in communities, a very important point to be considered is the relative poverty, ease, or luxury in which different parts of the population live, or the sickness and death-rates of so-called social classes.

That extreme poverty, producing inability to obtain the amount of food, clothing, and shelter requisite to preserve health, is a direct cause of high death-rates, especially in northern climates, is known to all; but the extent to which this factor of want influences the death-rates in different countries or communities is by no means easy to determine, and thus far we have, for the most part, only data bearing indirectly upon this subject. For the provident, and presumably well-to-do, classes we have the statistics of life-insurance companies; but these are for selected lives, which fact tends to give a low death-rate during the early years of the policy-holders; while, on the other hand, the tendency to cease paying annual dues and to give up the insurance is greater in those who are well and strong than in those who have reason to suspect that they are diseased, so that the death-rates in the greater ages are higher in the insured than in those not insured. We can only draw some inferences from the vital statistics of occupations, from tenement-house statistics, etc.; but it is very difficult to distinguish between effects of density of population, occupation, race, intemperance, uncleanly habits, and actual want of the necessaries of life.

One of the latest systematic attempts to enumerate the population of a city by social classes, and to obtain corresponding reports of deaths so as to give death-rates, is that made in Dublin by Dr. Grimshaw.

In this connection may be mentioned the statistics collected by insurance companies among the Quakers, or Society of Friends, both in England and in this country.

In 1830 Mr. Robert Ranking published a table showing the probability of life among the Society of Friends in the city of Bristol, England.

The superior expectation of life shown in this city led to the establishment of a Friends' Provident Insurance Institution in the following year, due to the belief that the members of this society had a superior longevity ; but the parties concerned, with their usual business sagacity, did not invest money on a mere belief. They set to work and collected all the registers of Friends in different parts of the kingdom, with births and deaths, from which a table was prepared showing that at birth the expectation of life was :*

At	5 years	41.8	years.
"	10 "	45.3	"
"	15 "	42.1	"
"	20 "	39.2	"
"	30 "	33.3	"
"	50 "	21.2	"
"	60 "	14.7	"

The tendency now is to accumulate the best and the worst of the race in the cities. They draw to them the most enterprising, vigorous and prudent, whose tendency is to late marriages and few children, and thus tend after a time to lower the standard of the race. Where the tendency is to replace a feeble and lower race by a better one, there is progress ; where the tendency is the reverse, there is decay. The hope that by increased knowledge, charity, and co-operation, the feeble, the sickly, and incompetent can be so cared for that they shall become strong and vigorous, is that held by most men of the present day, but there is nothing in the laws of heredity which gives any foundation for this hope.

What is to be the outcome of this modern civilization? "Its enemies are not without, but within ; not savage nations on its borders, but dwellers in its own cities." The general tone of modern European literature is pessimistic as to the future, filled with doubts and fears as to what the coming supreme democracy will do. In this country it is more hope-

* See *Insurance Cyclopædia*, vol. v., p. 144 ; also table on page 147, comparing expectation of life of Friends with those of the general population, and showing a decidedly higher average for the former.

ful, and looks forward to progress in improvement in the physical conditions of the race, though admitting the dangers and difficulties which this very physical improvement tends to produce. But, whatever be the views of individual thinkers and writers, on one point all can agree, and that is as to the desirability of having at our command definite, positive information as to the character, amount, and set of currents of this stream of human life in different countries and localities. An important part of such knowledge is that which relates to the composition of, and changes in, the population in different countries, which is the special field of vital statistics.

CULTIVATED RICE was first produced from a wild plant called in India nivara. The wild plants grow on the borders of the lakes in India, and also Australia. Some wild varieties are also found in North America.

The cultivated varieties are quite numerous, some kinds being adapted to marshy lands and some to highlands, the latter being cultivated like corn. Rice was known in China 2800 years before Christ; it is not mentioned in the Bible, but it is referred to in the Talmud. It was known in Syria 400 years before Christ, was first introduced in Italy in 1468, and in the Carolinas in 1700. Rice constitutes the most important article of food in all tropical countries, and is rapidly becoming an important factor in the food of all nations.

The finest and most prolific varieties are aquatic, requiring a system of flooding and drainage, which necessarily limits the area of profitable production, and hence the price will always be high in proportion to that of other grain. The best lands for rice culture are level marshes where they can be drained and flooded at will. Louisiana, and especially the parishes of Cameron, Vermilion, and Calcasieu, contain large areas of the finest rice land in the world. The time is not far distant when these lands will produce a large portion of the rice consumed in the United States. At the present time the farmers in the parish of Calcasieu are raising annually over 50,000 barrels of the finest quality. Yet there are thousands of acres of these lands that can be cultivated, and will produce more money to the acre than can be obtained from the cultivation of any other cereal with the same labor.—*The Fountain.*

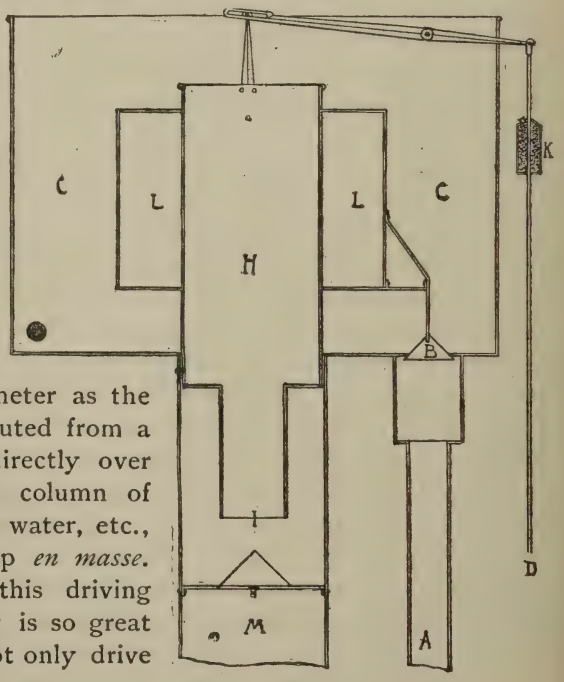
NEW MODEL FOR A WATER-CLOSET.

By SAMUEL G. DIXON, M.D., Professor of Hygiene, University of Pennsylvania.

THE apparatus herein about to be described would appear, from a sanitary point of view, to have advantages not hitherto obtained.

First: In that there is less churning of the water used to drive the fæcal matter from the traps. Much agitation of the water containing the matter in the bowl of a closet causes micro-organisms and odor to be driven off into the air of the toilet-room.

Second: In that the fæcal matter, as deposited, is carried to a narrow portion of the bowl below the mouth of the ventilation-pipe. This renders the area to be ventilated sufficiently small to make it practicable to draw all odor from the surface of waste matter held in the closet during use.



Third: In that a comparatively solid stream of water as large in diameter as the trap itself is spouted from a pipe opening directly over the trap. This column of water drives the water, etc., out of the trap *en masse*. The force of this driving column of water is so great that it would not only drive

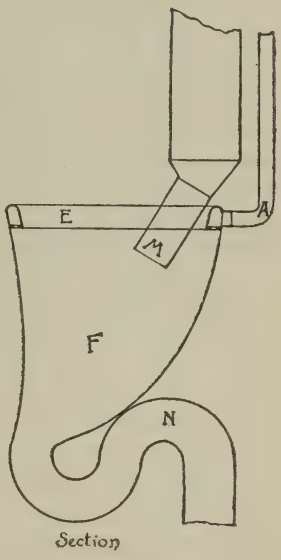
all the water out of the trap, but cause such syphonage that the trap would be emptied, were it not for the fact that the descending branch of the trap is enlarged. This gives the stream room to break and mingle with air, thereby preventing syphonage.

Fourth: In that every part of the closet is accessible, it can be cleaned with perfect ease.

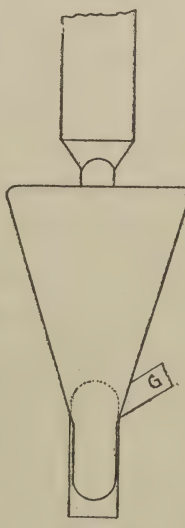
A reference to the accompanying cuts will show the manner by which the aforesaid advantages are obtained:

A indicates a pipe leading from valve B opening into water-tank C. Valve B is opened by pressing upon seat of closet; weight on the seat elevates rod D by means of a crank (not shown). By elevating D valve B is thrown down. This permits a small stream of water to flow into pipe A, which leads into chamber E, which chamber encircles the top of bowl of the closet F. This chamber permits a gentle flow of water through a succession of small holes surrounding the upper circumference of the bowl. The water continues to be gently distributed over the entire surface of the bowl F, keeping it moist during the entire time the closet is in active use. This gentle flow of water also serves to carry the foreign matter, as discharged, down into the narrow portion of the bowl below the mouth of the ventilating-pipe G.

At one and the same time that valve B is dropped sub-tank H is also dropped, thereby closing valve I. The lowering of sub-tank H permits the water to flow into it from tank C. In this manner sub-tank H is filled



Section



Front.

during the time the closet is in active use. It is charged by the time the weight (of person) is lifted from the seat, which act permits rod D, with weight K and air-tank L, to open valve I by raising sub-tank H. At the same time valve B is closed, thereby stopping the flow of water through pipe A; sub-tank H having been filled during the time closet was in active use, and valve I opened immediately upon the weight (of person) having been removed from seat of closet, the contents of sub-tank H is discharged through a pipe of the same diameter as the mouth of the trap, which opens in a direct line with the upper opening of trap or outlet of bowl F.

This column of water forces the water and other matter out of the trap *en masse* without throwing micro-organisms and odor off into the room furnished with closet.

N shows the point at which the trap enlarges so as to prevent syphonage.

TUBERCULOSIS IN SLEEPING-CARS.—The plush, velvet, and silk hangings must go. Seats must be covered with smooth leather that can be washed off; carpets give place to rugs, to be shaken in the open air at the end of every trip—better still, abolished for hardwood floors; the curtain abomination must make way for screens of wood or leather; the blankets of invalids' beds be subjected to steam at a high temperature; mattresses covered with oiled silk, or rubber cloth that may be washed off; and, above all things, invalids provided with separate compartments shut off from the rest of the car, with the same care which is taken to exclude the far less offensive or dangerous smoke of tobacco; cuspidors half filled with water, and consumptive travellers provided with sputum cups which may be emptied from the car. It is not necessary to say here that the sole and only danger lies in the sputum. The destruction of the sputum abolishes the disease. When the patient learns that he protects himself in this way as much as others--protects himself from the auto-infection, from the infection of the sound part of his own lungs—he will not protest against such measures.—*Dr. I. W. Whitaker, in the American Lancet.*

SOME MASSACHUSETTS SCHOOL-HOUSES.

SEVENTEEN years ago THE SANITARIAN prepared and published a lithograph of a certain grammar school-house in New York, showing how the class-rooms were supplied with *fowl* air—the janitor of the building having improvised a chicken-coop in the mouth of the furnace air-shaft, and his son, with like ingenuity, a pigeon roost in the cupola. This and other exposures of foul air from a variety of sources, promotive of school-room stunting, were extensively echoed by the public press, taken up by the New York Medico-Legal Society, and prosecuted with such vigor as to secure some marked improvements hereabouts and to attract attention throughout the State—indeed, the country. But membership in boards and superintendents of education are subject to change, and common observation abundantly justifies the remark that knowledge of such matters is but rarely a condition to appointment, and ignorance of them is a standing menace to the well-being of school-children.

The following extract, from a recent number of the *American Architect*, is an example :

" The Massachusetts Legislature, which is well known for its benevolent disposition, heard, in 1888, that children in school-houses did not have all the fresh air to breathe that would be good for them, and forthwith passed a law commanding that ' Every public building and every school-house shall be ventilated in such a proper manner that the air shall not become so exhausted as to be injurious to the health of the persons present therein.' The enforcement of this decree was referred to the District Police, and the legislators, conscious that they had deserved well of their constituents, turned their attention again to more important business. Fortunately for the Massachusetts children, the Chief of the District Police is a man who conceives it to be his duty to enforce laws, instead of maintaining the urbane unwillingness to believe that any one could be thinking of violating them, which renders certain officials so popular, and, in enforcing them, he takes pains to learn something about the subject to which they relate, so as to be able to carry out his mission fairly and

efficiently. Hence it came about that, instead of buying an interest in a 'sewer-gas cremator' patent, and ordering that a three-quarter-inch pipe should be carried from each privy vault to the furnace-grate, he put his inspectors in the way of finding out what was the proper quantity of fresh air to be supplied per hour to school-children, and of applying anemometers and carbonic-acid tests to see whether they got it, and then sent them out to examine the school-houses throughout the State. As architects can well imagine, the result of the investigation would have been, in some cases, amusing, if it had not also been tragical. On the whole, the ventilation of the school-houses seems, from the printed report, to have been creditable to the State, and there are indications of a popular knowledge of the importance of fresh air, and a perception of the methods of getting it, which hardly existed ten years ago; but there are also plenty of illustrations of the stolid, brutal ignorance of the physical needs of children, and indifference to their sufferings, which have by no means yet died out among school committees and town officers.

"Among the examples of criminal ignorance and stupidity in school-building, the worst, perhaps, is furnished by a case in Salem, where a four-room school-house, accommodating one hundred and sixty pupils, was found to have been planned with privies in the basement, the vaults of which were 'ventilated' by two galvanized-iron pipes, one four inches and the other six inches in diameter, carried to the chimney. The rooms above were also 'ventilated' by means of registers at floor and ceiling, opening into the same chimney, and, apparently, into the same flue. It is hardly necessary to say that even the teachers, who, it must be remembered, in most Massachusetts towns are elected annually, and know that their position depends upon the delightful perfection which they discover in everything that the school committee provides for them, 'perceived a foul atmosphere' at certain times in the rooms, but it was not until seven cases of diphtheria had occurred among the pupils, with four deaths, that attention began to be called to the injudiciousness of ventilating, by diffusion, the privy-vaults into the class-rooms, and the school was ordered closed until changes were made. In another large and important school-house, built in 1872, the inspector

was apparently startled at finding the air in the basement charged with fifty parts in ten thousand of carbonic acid, and it turned out that the privies were in a building about thirty feet away from the main school-house, but that, not to lose entirely the charm of their presence, a well had been dug in the school-house cellar, which undoubtedly received the drainage from the vaults. For some time the children in the school were given water from this well to drink, but a few years ago the stench from it became insupportable, and it was filled up. Though lost to view, the well took care that it should not be forgotten, by sending forth an aroma, which pervaded, more or less, the building. The arrangements for getting rid of the healthful atmosphere were as judicious as those by which it was produced. Three 'ventilating ducts' were built in the brick walls, communicating, by tortuous wooden boxes, with the roof. There were openings from the top of the rooms into these 'ducts,' but, as they were not warmed, nor was any inducement offered them to exercise any 'ductile' power, they declined to do so, just as any other 'duct' of the kind does under similar circumstances. One is hardly surprised to find that boards were nailed over the 'ventilating' outlets, to save fuel, as was the case in other instances. In several school-houses, the so-called 'ventilators' opened from the rooms into a garret, or other entirely enclosed spaces, and, of course, there was no movement of air whatever through them; but even the pretence of ventilating openings was in several buildings boldly abandoned. In one large school-house, with an average attendance of more than three hundred children, there was absolutely no provision for ventilation except by the windows and doors. Even the furnaces, three of which were used, had no fresh-air supply, but gathered the air which descended from the upper stories to the cellar floor, warmed it up, and delivered it again to the rooms above. The cellar was used to store coal, wood, ashes, and the sweepings from the school-rooms. The floor was flooded with water after all heavy rain-storms, and the wood-pile stood over a bed of wet, rotten rubbish, which had been accumulating for years. The same state of things was found in another large school-house in the same town, and the inspector ordered it remedied. Thereupon arose a storm of indignation in the town. 'A leading medical practitioner' got up in town-meeting, and

said that the two school-houses in question were 'well ventilated;' that there 'had been more sickness among school-children from too much ventilation than from too little,' and that the requirements were 'absurd.'"

SCHOOL REFORM IN PARIS, which has lately been effected by the commission appointed for that purpose, is thus treated by the *Journal de Médecine de Paris:*

"We cannot allow the reforms which have been decided on in regard to the distribution of study hours and of recreation in the lyceums, colleges and universities, to pass without notice, especially as this amelioration has been brought about mainly by the persistence of the medical profession, represented in this case by Professor Brouardel. There is no doubt that all the members who formed the commission charged with studying these reforms were not animated with the same spirit or the same desire for reforms; certainly some were of the opinion that it would be useful to diminish the hours of study and to increase those devoted to bodily exercises; it is not less true that it required all the persuasive eloquence of the Dean of the Faculty of Medicine to bring over the majority of the commission. The medical profession could not, therefore, have been better represented in that body.

"It is not alone in the increase of the number of hours devoted to recreation that the reform consists, but also in the more rational employment of the time devoted to recreation, which will be hereafter occupied more profitably, especially by giving more activity and more method in the regulation and the development of all the physical exercises and in combining and grading them according to the age of those who will take part in them. This, it is believed, will be much better than the careless methods heretofore allowed, and will be far superior to the classic exercises of the horizontal bars, because those now adopted will be properly varied and made interesting. A strict system will be introduced into practice and the pupils will be marked, and these marks will count in grading the scholar with the marks obtained for regular studies. It is evident, then, that the system of education adopted will be much nearer to the ideal dreamed of by M. Rochard in his excellent treatise on physical training." T. P. C.

A PAUPER CITY.

THIS looks like a rather singular title to apply to the city of Philadelphia, generally supposed to contain about one million people, more comfortably housed than those in any other great city of the world; but what else can we say, when 214,000 of this number accept public pauper medical service? That was the number of patients who visited the recognized hospitals and dispensaries of Philadelphia last year; and it does not include those who attended the many private dispensaries, or that other multitude which went to a doctor's office, but neglected to pay him.

There is entirely too much beneficiary work done here. Is it, we wonder, as bad in other great cities?

The mass of the inhabitants seems to be lost to all that fine sensibility, that sense of honor, which prevents a proper-minded man from accepting a gratuity except under the most pressing adversity.

Our dispensaries are ostensibly for the poor; but, actually, they are attended, to a great extent, by the so-called "middle class;" and it is not unusual to see patients in the waiting-room assuming airs that would ill become them even in the physician's office.

Let us cite a few examples from life, to illustrate both the class of patients at our dispensaries, their character, and that utter lack of fine sensibility of which we have just spoken.

A short time since, a woman who had received free examination of her eyes, and a prescription—which was filled for a trifle at the hospital drug-store—came sweeping back into the dispensary-room with, "Have you any paper here to wrap this bottle in?" Upon being informed that the physicians did not keep a stock of wrapping paper on hand, she stalked majestically back to the drug-store, deposited the bottle there, and left the institution in disgust.

She was not too "high-toned" to carry about a card having on it, "Free Services to the Poor Only," and to sit for several hours in company with the city's alley brigade; but she was

entirely too high-toned to carry along with her a dispensary bottle that had not been carefully wrapped up and tied with red twine.

On another occasion, in the same dispensary, a young woman insisted—this is not infrequent—upon being waited on at once. The physicians knew that her father was quite comfortably situated, so one of the assistants suggested to her that the dispensary was not the place she ought to come to, advised her to tell her father so, and to report to his office that evening. This was the report : "Father says that he doesn't see any use in paying so long as he can have my eyes measured for nothing, and he wishes me to go to the hospital."

At another time, a would-be patient came in, whose father —one of the assistants chanced to know—had lately bought a house for $16,000.

We might detail similar occurrences *ad nauseam*, provided we have not already reached that point, but will rest content by giving only one more, the most outrageous of all. A man entered the eye department of this same dispensary, and, with a friendly, benevolent air—as if conscious of the favor he was doing—said to the chief of clinic, "You may look at my eyes if you wish to." The oculist gratefully accepted the privilege, and carefully examined the orbs, giving especial attention to the one that manifested a decided "cast ;" and, after the inspection, the patient—still evidently in a generous mood—remarked, "I'll let you operate on that eye for ten dollars." Tableau.—E. B. S.—*Times and Register.*

The practices above described and implied are by no means peculiar to Philadelphia ; they are at the least equally prevalent in New York and Brooklyn—so benevolent are the doctors and the trustees of hospitals and dispensaries.—Editor SANITARIAN.

NOVEL METHOD OF LAYING A FLOOR.

THE *National Builder* says that a curious method of laying down floors has been adopted in France and has obtained a wide application. It consists in putting down flooring, not as hitherto on sleepers, but in embodying the boarding in asphalt.

The new floors are used mostly for ground stories of barracks and hospitals, as well as for churches and courts of law. Very little is known of the method outside of France, and as its usefulness is evident, it should have a wider application; therefore we append the following description:

For the floors in question, pieces of oak, usually two and one half to four inches broad, twelve to thirty inches long, and one inch thick, are pressed down into a layer of hot asphalt, not quite half an inch thick, in the well-known herring-bone pattern.

To insure a complete adhesion of the wood to the asphalt and obtain the smallest possible joints, the edges of the pieces of wood are planed down, bevelling toward the bottom, so that their cross-section becomes wedge-like. Nails, of course, are not necessary, and a perfectly level surface may be given to the flooring by planing after laying down. The advantages of this flooring, which only requires an even bed on which to rest, are said to be the following:

1. Dampness from below, and its consequences, rot, is hereby prevented.

2. Floors may be cleaned quickly and with the least amount of water, insuring rapid drying.

3. Vermin cannot accumulate in the joints.

4. Unhealthful exhalations from the soil cannot penetrate into living-rooms. Asphalt being impermeable to damp, rooms become perfectly healthful, even if they are not vaulted underneath.

In building with several stories, as in hospitals, the vitiated air of the lower rooms cannot ascend, an object which it has hitherto not been possible to attain by any other means known.

5. The layer of asphalt will also prevent the spreading of fire from one floor to another in case of conflagration.

The flooring here described has been laid in the numerous casements of the forts around Metz, to the satisfaction of the authorities. The cost is about twenty-five cents per square foot. This estimate, somewhat high, would be much lower in districts where oak and labor are cheaper, and the distance from places of construction less.—*American Gaslight Journal.*

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

INTERNATIONAL SANITARY REGULATIONS.

The Pan-American Congress at Washington, at a recent session, condemned attempts at absolute isolation as a means of preventing the spread of epidemic diseases, and recommended instead the disinfection of all articles from infected localities before their introduction into healthful places, and adopted the following propositions as a basis of international action :

" That, taking the existing state of the relations between the nations of America, it is as practicable as it is advisable for the promotion of these relations to establish perfect accord with respect to sanitary regulations.

" That the greater part of the ports of South America on the Atlantic are guided and governed by the decisions of the International Sanitary Convention of Rio Janeiro of 1887.

" That, although it does not appear that the plans of the Sanitary Congress of Lima, of 1889, have passed into the category of international compacts, it is to be hoped that they will be accepted by the Governments that participated in the said Congress, because those plans were discussed and approved by medical men of acknowledged ability.

" That the Sanitary Convention of Rio Janeiro, of 1887, and the draft of the Congress of Lima, of 1889, agree in their essential provisions to such an extent that it may be said they constitute one set of rules and regulations.

" That if these were duly observed in all America they would prevent under any circumstances the conflict which usually arises between the obligation to care for the public health and the principle of freedom of communication between countries.

" That the nations of Central and North America were not represented either in the Sanitary Convention of Rio Janeiro

or the Congress of Lima, but that they might easily accept and apply to their respective ports on both oceans the sanitary regulations before cited."

EXAMPLE FOR NEEDFUL HEALTH LEGISLATION IN AMERICA.—In England a bill for the amendment of the Public Health Acts has been introduced recently, in order to render local legislation more uniform. It proposes that refuse and other injurious matters are not to be allowed to pass into sewers, and waste steam, condensing water, or heated water from a boiler must also be kept out. Urban authorities are to have power to erect sanitary conveniences, and to charge fees for their use. Every building used as a workshop or manufactory is also to be provided with sanitary conveniences in proportion to the number of persons employed. Rooms over privies are not to be used as dwelling or sleeping rooms. The erection of any embankment or filling up of building sites with offensive matter is to be prohibited. The urban authorities are also to be endowed with powers for dealing with houses that are unfit for human habitation. Buildings described as lock-up shops or workshops are not to be used as dwellings. If any person erects any new building, or raises any existing building to a greater height than the adjoining building, he is, at the request of the owner of the adjoining building, to build up any flues of chimneys to the height of those on his own building, and at his own expense. Another clause relates to the provision of affording adequate means of ingress and egress for places of public resort. Some of the provisions are in force at present in a few towns, but the new bill would make them general.

THE INTERNAL REVENUE RECEIPTS FROM ALCOHOLIC LIQUORS, were for the first six months of the current fiscal year, from July 1st to December 31st, 1889: from distilled spirits, $39,164,949.08, an increase over the corresponding six months in 1888 of $3,799,468.92; from fermented liquors, $69,077,832.08, an increase over the same period in 1888 of $5,766,266.59.

If the costs to the nation by disease and premature death, vice and crime, among the liquor consumers for the same

period could be summed up, the amount would doubtless be greatly in excess of the revenue.

Surely, under such appalling circumstances, if prohibition is impracticable, as the law-makers declare, they should at least devise some means of restriction. For this progress from bad to worse is not only sapping the health of the people, but the national purse.

A NEW METHOD OF TESTING WOOLLEN GARMENTS is by putting caustic soda into a cup of water and dipping the article whose genuineness is doubted into the mixture, of course being careful not to touch the liquid. The caustic soda will quickly eat animal fibres, but has no effect upon those of vegetable origin. If the article is all wool, it will be dissolved in the liquid, leaving nothing but a trace of coloring matter. If the material is cotton, it comes out unscathed. When the material is wool supported by a framework of cotton, the latter being distinguishable to the eye or by ordinary test, the caustic soda quickly divorces the two, dissolves the wool and leaves the cotton as clean as if it had been woven by itself.

"OLIVE"-OIL FROM A NEW SOURCE.

If there is any plant which does not or would not grow in some part of America it does not occur to us at this writing; and not only so, but there is scarcely any animal or mineral product which is a source of wealth, happiness, or satisfaction to any country or climate outside of this fair land but that it is also produced, or something just as good, if not better than it. The historic olive, which has waved its dark green branches over so many scenes connected with the birth of civilization and religion, flourishes in California as well as in Syria or in Italy, and we can erelong have all the olives and olive-oil of the classical kind that we require of our own production, if we will. But we need not want for olives and olive-oil so long as we have a wholesome substitute quite as good, if not, indeed, in some respects better.

It is a well-known fact that the olive crops of Italy, France, Spain, and other countries, which have been relied upon for centuries, have been diminishing from natural causes. Fortunately enough, just as the supply of olive-oil is lessening and

the price rising the cotton plant is found to give a substitute equal to the genuine. It is a case parallel with that in which the gradual extinction of the whale was rapidly followed by the discovery of petroleum and its products, and their superiority to whale oil, which had been for ages before depended upon as an illuminant and lubricant.

The "olive" plant of America is that which has been grown in our Southern States for many decades. With its appearance and methods of cultivation all are familiar: it is the cotton plant.

This wonderful *gossypium*, with its beautiful flowers and still more beautiful bolls, is fast becoming no less famous as a food product for both man and beast than it has ever been for yielding material for clothing and to make the sails for the white-winged messengers which traverse the world of waters. Besides which it is now being used by millions of tons yearly in the production of food.

After the fibre has been ginned off and the lint removed from the seed for clothing the seed are pressed so as to yield two things: Firstly, an excellent substitute for *olive*-oil as a salad dressing and in cookery; by mixture to improve the flavor and keeping qualities of hog's lard; and as a lubricant in the arts, particularly in wool finishing. Secondly, the compressed oil-cake, from which the oil has been expressed, still retains so large an amount of nutritive material as to be excellent food for cattle, and when insufficient use is found for it for this purpose, is no less excellent as plant food—among the most valuable of manures.

The ancient olive-tree gave shelter and food; the modern substitute, food and clothing.

"WAS there ever," says *Banker's Monthly*, "such a history as that of the cotton-seed? For seventy years despised as a nuisance, and burned or dumped as garbage, then discovered to be the very food for which the soil was hungering, and reluctantly admitted to the rank of utilities, shortly afterward found to be nutritious food for beast as well as for soil, and thereupon treated with something like respect. Once admitted to the circle of farm industries, it was found to hold thirty-five gallons of pure oil to the ton, worth in its crude state $14 to the ton, or $40,000,000 for the whole crop of

seed. But then a system was devised for refining the oil up to a value of $1 a gallon, and the frugal Italians placed a cask of it at the root of every olive-tree and then defied the Borean breath of the Alps!"

OIL FROM CORN is one of the latest products which modern science every now and then throws upon the world. The maize, which is now grown in the United States at the rate of some 2,000,000,000 bushels per year, has been experimented with and found capable of yielding three and one eighth per cent of its weight in oil, the germ of the kernel being the part from which the oil is extracted. The new material is of a pale yellow color, somewhat thicker than either the olive or cotton-seed oil, and does not seem to be readily available as a substitute for them, but it is well adapted for lubricating purposes, and may be used as a salad dressing, while it seems to be adaptable for liniments.

THE NEW YORK PHYSICIANS' MUTUAL AID ASSOCIATION.—The twenty-first annual report shows a gratifying condition of affairs in a society which claims attention from the medical profession in this State, not only as a worthy charity within limits which are of special significance to every medical man, but as a very favorable life insurance investment. The membership is now over seven hundred and is rapidly increasing. It should be a matter of interest to every member, and indeed to every member of the profession, that this society be so sustained and developed that the reproach should no longer be heard that physicians die penniless. With proper enthusiasm the membership could readily be increased to five thousand, or even more, for physicians from all parts of the State are eligible. We ask the earnest attention of our *confrères* to this important matter. Any information upon the subject will gladly be furnished by the President, Dr. Daniel Lewis, 62 Park Avenue, or the Secretary, Dr. N. G. McMaster, 322 East Fifteenth Street.

"CHANGE OF CLIMATE is what you need," said the high-priced physician, after he had listened to all the details of the patient's case. "Change of climate!" exclaimed the patient, in surprise. "Why, man alive, I've never had anything else. I've lived right here in New England all my life."

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

CORRESPONDENTS under this head are particularly requested to be prompt.

ALABAMA.—*Mobile*, 40,000 : Reports 44 deaths during February, of which 12 were under five years of age. Annual death-rate, 13.2 per 1000. From zymotic diseases, 7, and from consumption, 9.

CALIFORNIA.—For the month of February, 1890, the Secretary's abstract of the reports received from 103 cities and towns, with an aggregate population of 822,950, the number of deaths was 1156. Annual death-rate, 20.64. Deaths from consumption during the month, 249. From zymotic diseases : Diphtheria and croup, 18 ; typhoid-fever, 20 ; typho-malarial-fever, 1 ; cerebro-spinal-fever, 5 ; diarrhœal diseases, 9 ; whooping-cough, 6 ; scarlatina, 1 ; acute respiratory diseases, 198.

CONNECTICUT.—For the month of February, 168 towns, with an aggregate population of 759,022, report 1089 deaths, 224 being under five years of age. Annual death-rate, 17.2 per 1000. Deaths from zymotic diseases numbered 124, and from consumption, 132 ; acute respiratory diseases, 156.

In our January number we had occasion to report the outbreak of small-pox among the workers in foreign rags in the Seymour Paper Mills at Windsor Locks. Of this outbreak the Secretary of the State Board of Health reports, in his bulletin for February :

" *Small-pox*, which started, as it very commonly does, from a rag department of a paper mill, appeared in January in Windsor Locks. It appeared soon after in some of the adjoining towns ; one case in Waterbury. These cases were immediately put under proper regulations and controlled ; but in Meriden the disease has been allowed greater liberty. The first suspicious case was reported to the health authorities.

Six doctors examined it, but as four asserted it was chicken-pox, and only two thought it varioloid, the majority of course ruled and no protective measures were taken. The laws of nature, however, are not subject to majorities, like the health authorities of Meriden. Meriden was also unfortunate in being a double-headed town, having two boards of health, a town board and a city board. So that when a little after, other cases of 'chicken-pox' ripened into the genuine small-pox, there was still no decisive and energetic action taken to control it and protect the public. On the contrary, with astonishing deliberation the two boards of health officials called a joint meeting for the *next day*. This meeting, which the Secretary of the State Board of Health was invited to attend, was not called to decide upon the best methods of guarding the public. Those questions did not seem to be interesting. The chief discussion was whether the town or the city was liable for what expense might be incurred. Upon this pitiful dispute, with small-pox in several places in the city, these two august bodies, the representatives of sanitary administration in the town and in the city of Meriden, wasted time wrangling about results, when every passing hour was precious to prevent the spread of the contagion. Is it remarkable that with such guardians of the public health there were a dozen cases of small-pox in Meriden before the end of the month?''

District of Columbia.—Total deaths during four weeks ending February 22d, 418, of which 111 were under five years of age. There were 192 deaths in the colored population. Annual death-rate, 21.7. Zymotic diseases caused 39 deaths, and consumption, 62; acute respiratory diseases, 107.

Illinois.—Tenth Annual Report of the State Board of Health for the Year 1887, with an Appendix embracing Coroners' Inquests, Meteorological Tables, Illinois Army Board of Medical Examiners, and Official Register of Physicians and Midwives. Pp. 403. The delay in issuing this report, we are told, is owing to the complications that existed in the State printing contract during the year 1887 and 1888. Meanwhile, however, the Board has issued most of the material comprised in this volume piecemeal, by the review of which,

in due course, our readers are already, for the most part, familiar with it. More than three fourths of the volume are taken up with the Official Register of Physicians and Midwives. But the registration is revised to January 1st, 1890, comprising the identification of 6165 certified physicians, and recognizing about fifty more recent graduates, who had not yet had time to comply with the law. The practical benefit of the persistent exclusion of incompetent medical practitioners is shown by a tabular statement of the restricted number of medical practitioners during the last ten years, notwithstanding the marked increase of population in the State. The number respectively for the years 1880, 1881, 1884, 1886, and 1890, was 6029, 6037, 6148, 6115, and 6215.

Progress in elevating the standard of medical education is shown by the diminution of the number of medical students throughout the country, notwithstanding the increase of population.

"In 1882–83 out of every 1000 matriculates 322 were graduated, taking both the United States and Canada and all schools of practice into account. In 1886–87 only 294 out of every 1000 matriculates were graduated. In the United States alone, in 1882–83, out of every 1000 matriculates 331 were graduated, while in 1886–87 only 305 out of every 1000 matriculates were graduated."

These are encouraging signs in the progress of preventive medicine, and are in the highest degree creditable to the pioneer in weeding out quackery and elevating the standard of medical education in the United States—*Dr. John H. Rauch, Secretary of the State Board of Health of Illinois.*

At the Annual Meeting of the Board, January 30th, 1890, the Secretary submitted a special report upon the pandemic of so-called influenza, comprising a historical sketch of the disease and its progress during the recent epidemic, but nothing new in regard to its nature. The cholera in Mesopotamia, diphtheria, scarlet-fever, small-pox, and typhus-fever (in New York) were briefly discussed, and a special communication submitted on Chicago Sewage and the Water Pollution :

"Not only is the river a nuisance in its present condition, but it is a positive source of danger to the health of the citizens of Chicago, which will increase with its growth in population.

The sanitary interests of Chicago and the communities in the Des Plaines and Illinois valleys imperatively demand that the sewage of Chicago, pumped into the canal, shall be diluted on the minimum scale of 14,000 cubic feet per minute, for every 100,000 people who drain into the Chicago River. The sanitary interests of Chicago require the increase of pumping to at least 120,000 cubic feet a minute at this time. With comparatively small outlay the canal can be made to carry 100,000 cubic feet a minute, though probably one or two bridges would have to be raised."

Chicago, 1,100,000: Reports for February 2020 deaths, of which number 946 were under five years of age. Annual death-rate per 1000, 22.03. From zymotic diseases there were 412 deaths, from consumption, 178, and from acute respiratory diseases, 946.

KENTUCKY.—*Louisville.* By telegraph to the *Medical News*, April 5th, the total number of deaths caused by the tornado of March 27th, reported up to that date, is ninety-six, wounded about two hundred. The injuries resulting fatally are, in the order of frequency, fractures of the skull, thoracic injuries from pressure, asphyxiation from gases, burns, and shock. But few of the wounded will die. As a comparatively small number of the poorer classes were among the injured, the hospitals are not crowded, the City Hospital having but five cases, Sts. Mary and Elizabeth and Norton Infirmary having about fifty.

The water-works are so seriously damaged that repair is impossible for many days, and a water famine with its serious results is certain.

The hygienic condition of the city is now more influenced by the snow and rain than by the direct effects of the cyclone.

There are rather more zymotic diseases and pneumonia present than usual, but otherwise there is little of medical interest. No outside help is required.

LOUISIANA.—*New Orleans*, 254,000: During the four weeks ending February 22d there were 519 deaths, of which 158 were under five years of age. There were 168 deaths in the colored population. Annual death-rate per 1000, 26.65. From zymotic diseases there were 80 deaths, and from consumption, 56; acute respiratory diseases, 46.

MARYLAND.—*Baltimore.* Annual report for the year 1889: Estimated population, whites, 423,782; colored, 75,561: 500,343. Marriages, 4480—8.96 per 1000; births (reported), whites, 8102—19.12 per 1000; colored, 640—16.40 per 1000: 18.73 per 1000. Deaths, whites, 6819, death-rate, 16.06; colored, 1884, death-rate, 24.47: 8703, death-rate, 17.40. Of children under five years of age, 3505—40.27 per cent.

From zymotic diseases, 1708—19.6 per cent.

From consumption, 1147—13.2 per cent.

Baltimore is, doubtless, one of the most healthful unsewered cities of its size in the world. Indeed, there are very few of its size that are not sewered. But while unusually careful sanitary administration has hitherto, in a great measure, maintained its healthfulness despite the need of sewerage, there can be no question that its ratio of mortality from zymotic diseases, consumption, and other pulmonary diseases would be materially lessened thereby. There is reasonable ground to expect that the accomplishments and energy of the new Commissioner of Health, Dr. George H. Rohé, will be effectual in adding such force to the enduring urgency of his predecessor as to bring about this greatly needed addition to the means of promoting the health of the people.

During the four weeks ending February 22d there were 787 deaths, of which 289 were under five years of age. Annual death-rate, 20.45 per 1000. There were 93 deaths from zymotic diseases, 114 from consumption, and 159 from acute respiratory diseases.

MASSACHUSETTS.—*Boston.* Annual report for the year 1889: Estimated population, 420,000. Deaths during the year, 10,259; death-rate, 24.42, reckoning the present population of the city at 420,000. This is a high rate, but it is necessary to analyze the list of deaths and their causes in order to see how far sanitary administration can be held responsible for this record. Nineteen hundred and sixty-eight are due to causes which are generally classed under the head of preventable diseases—that is to say, 19.18 per cent of the total deaths were from zymotic diseases, while 80.82 per cent were from other causes. There were 1431 deaths from consumption, 938 from pneumonia, 448 from bronchitis, and 789

from heart disease. These, together with the deaths from violent causes, old age, Bright's disease, and cancer, account for nearly one half the total number of deaths. Of the deaths from preventable causes, diphtheria was the cause of the largest number, there having been 564 deaths from this disease, and 450 from cholera infantum. The death-rate among children under five years of age was 35.41 per cent, against 35.2 the previous year, but still a comparatively low percentage of the total mortality.

With regard to *tuberculosis* among cattle: "Among the 10,000 animals killed from October to January, there were found twelve cases of tuberculosis, among which were only two where the lesions were very extensive. Taking this as a basis, it would cost the city from $1600 to $2000 per year for indemnity.

"This may be considered as erring on the side of over-safety; but the cause of humanity demands that every step should be taken in the interests of preventive medicine, for this is the only path along which any real gain in lengthening human life can be claimed by medical science."

Reports for February, 1890, 742 deaths, of which number 224 were under five years of age. Annual death-rate, 21.2 per 1000. From zymotic diseases there were 106 deaths, from consumption, 125, and from acute respiratory diseases, 88.

MICHIGAN.—For the month of February, 1890, compared with the preceding month, the reports indicate that cerebro-spinal meningitis, cholera morbus, inflammation of brain, dysentery, measles, whooping-cough, typho-malarial-fever, and inflammation of kidney increased, and that typhoid-fever and cholera infantum decreased in prevalence.

Compared with the average for the month of February in the four years 1886–89, influenza, measles, cerebro-spinal meningitis, cholera morbus, and membranous croup were more prevalent, and cholera infantum, typhoid-fever, typho-malarial-fever, and scarlet-fever were less prevalent in February, 1890.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of February, 1890, at fifty-eight places, scarlet-fever at seventy-seven places, typhoid-fever at thirty-four places, measles at sixty-nine places, and small-pox at two places.

Reports from all sources show diphtheria reported at three places less, scarlet-fever at fifteen places more, typhoid-fever at fourteen places less, measles at forty-two places more, and small-pox at two places more in the month of February, 1890, than in the preceding month.

Detroit, 250,000 : Reports for the month of February 254 deaths, of which 65 were under five years of age. Annual death-rate, 13.24 per 1000. From zymotic diseases there were 41 deaths ; from consumption, 14 ; from acute respiratory diseases, 41.

MINNESOTA.—*St. Paul*, 180,000 : Reports for February 98 deaths, of which 40 were under five years of age. Annual death-rate, 6.53 per 1000. From zymotic diseases, 20, and from consumption, 6.

MISSOURI.—*St. Louis*, 450,000 : Reports for February 671 deaths, of which number 181 were under five years of age. Annual rate of mortality, 16.26 per 1000. From zymotic diseases there were 66 deaths, from consumption, 80, and from acute respiratory diseases, 145.

NEW JERSEY.—*Paterson*, 85,000 : Reports 131 deaths during February, of which number 46 were under five years of age. Annual death-rate, 18.1 per 1000. There were 7 deaths from zymotic diseases and 17 from consumption.

Hudson County, 292,734 : Reports 526 deaths during February, of which number 189 were under five years of age. Annual death-rate, 21.6 per 1000. There were 106 deaths from zymotic diseases and 65 from consumption.

NEW YORK.—The Secretary of the State Board of Health reports in the monthly Bulletin that there were 8578 deaths in 124 cities and towns, with an aggregate population of 4,158,241, during the month of February. This is about 1000 in excess of the average for that month for the past five years, and about 400 greater than that of February, 1889. The proportion of zymotic diseases (as in January) is far below the average, there being about 50 less deaths from these causes per 1000 deaths than a year ago. Scarlet-fever and measles

were then much more prevalent, these diseases being now below the average. Deaths from other zymotic diseases vary but little from the average. Deaths from all local diseases continue, as in January, much above the average, from the continued prevalence of epidemic influenza. The number of deaths reported as directly due to this disease is small, but it is frequently certified to as contributory, and chiefly to diseases of the respiratory and digestive organs. There are 500 more deaths from acute respiratory diseases, 300 from consumption, and 75 from digestive diseases, than in February, 1889. The death-rate of 134 cities and large villages is 21.24 per 1000 population annually, that of last month being 29.05, and of February, 1889, 21.32.

New York, 1,622,000 : Total deaths, 2988—35.1 per cent under five years. Annual death-rate, 23.95. From zymotic diseases there were 413 deaths, and from consumption, 512.

Brooklyn, 852,467 : Total deaths, 1428—34.3 per cent under five years. Annual death-rate, 21.77. From zymotic diseases there were 213 deaths, and from consumption, 194.

Buffalo, 230,000 : Total deaths, four weeks ending February 22d, 349—36.2 per cent under five years. Annual death-rate, 19.70. From zymotic diseases there were 38 deaths, and from consumption, 41.

Rochester, 130,000 : Total deaths, 162—29.00 per cent under five years. Annual death-rate, 15.00. From zymotic diseases there were 14 deaths, and from consumption, 28.

Albany, 103,000 : Total deaths, 204—37.5 per cent under five years. Annual death-rate, 23.76. From zymotic diseases there were 35 deaths, and from consumption, 25.

Syracuse, 87,000 : Total deaths, 113—22.1 per cent under five years. Annual death rate, 15.58. From zymotic diseases there were 13 deaths, and from consumption, 18.

NORTH CAROLINA.—For the month of January there were reported 137 deaths in a population of 102,900, representing an annual death-rate of 16.0 per 1000. There were 39 deaths under five years of age. From zymotic diseases there were 6 deaths, and from consumption, 21.

Wilmington, 23,000 : Total deaths, 36. Death-rate, 18.8 per 1000.

Raleigh, 15,000 : Total deaths, 30. Death-rate, 24.0 per 1000.

Charlotte, 13,000 : Total deaths, 17. Death-rate, 13.7 per 1000.

OHIO.—Fourth Annual Report of the State Board of Health for the year ending October 31st, 1889. Pp. 350. This report comprises the Secretary's summary of infectious diseases, the minutes of the several meetings of the Board during the year, the Monthly Bulletins, of which an abstract is regularly given in our pages under "The Progress of Infectious Diseases," etc., and special papers on Micro-organisms and their Relation to Disease, by S. P. Wise, M.D., of Millersburg ; Care of the Eyes, by C. F. Clark, M.D., of Columbus ; Money Value of a Low Death-rate, by H. H. Seys, M.D., Health Officer of Springfield ; Water Supply and Drainage of Delaware, by S. E. Allen, M.D., of Delaware ; Diphtheria Epidemic at Middletown, by John T. Stutphen, M.D., Health Officer of Middletown ; The Separate System of Sewerage as found at Canton, by Josiah Hartzell ; Diphtheria in Springfield, by W. W. Hall, M.D., and What our Schools may do for Sanitary Science, by E. T. Nelson, M.A., Ph.D., of Delaware.

From forty-three towns, with an estimated aggregate population amounting to 1,197,840, 16,762 deaths were reported, of which 5918 were of children under five years of age. Four thousand and sixty-nine, or about one fourth, were caused by zymotic diseases. Two thousand and ninety-eight, or 11.9 per cent, were caused by consumption.

The Secretary's Monthly Record for February, containing the statistics for January, was received too late for abstract in our March number. Sixty-five localities with populations running from 800 to 325,000 and aggregating 1,307,500, reported for that month 2164 deaths, an average death-rate of 19.01. The highest rates were : Ludlow Grove (1300), 73.85 ; Dunkirk (1800), 66.66 ; Bloomingburg (800), 60.0 ; Madison (1000), 48.0 ; South Charleston (1200), 40.0 ; Wadsworth (2500), 38.4 ; Felicity (1000), 36.0. The lowest : Tiffin (14,000), 1 death—0.9 (?) ; Warren (8000), 6.0 ; Salem (6000), 6.0 ; Piqua (10,000), 6.0 ; Delaware (9000), 6.6 ; Delphos (5000), 7.20.

During the four weeks ending February 21st, 1890, diphtheria was reported present in the following places, to wit :

Cincinnati, Cleveland, Columbus, Toledo, Dayton, Akron, Springfield, Zanesville, Youngstown, Canton, Mansfield, Defiance, Findlay, Piqua, Bucyrus, East Liverpool, Lancaster, Canfield, Millersburg, Ravenna, Lima, Linwood, Nashport, Oak Harbor, McComb, Bloomville, Geneva, Winchester, South Charleston, Moscow, West Liberty, and Penn Township.

Scarlet-fever was reported by health officers at Cincinnati, Cleveland, Toledo, Columbus, Springfield, Akron, Youngstown, Zanesville, Dayton, Canton, Massillon, Crestline, Piqua, Defiance, Bucyrus, Fostoria, Ravenna, Urbana, Chillicothe, Ironton, Portsmouth, Findlay, Mt. Vernon, Oberlin, Lorain, Kent, Miamisburg, West Cleveland, New Straitsville, Uhrichsville, Chester Hill, Springborough, Geneva, Norwalk, Shawnee, Salem, Lancaster, Middleport, and Madison.

Typhoid-fever was reported by health officers at Cincinnati, Cleveland, Toledo, Youngstown, Fostoria, East Liverpool, Edison, Norwalk, St. Bernard, Ada, Geneva, Clyde, Millersburg, Wadsworth, Bellaire, Painesville, Bedford, Versailles and Gilead Township.

Cincinnati, 325,000 : Reports for February 490 deaths, of which 196 were under five years of age. Annual death-rate, 18.09 per 1000. From zymotic diseases there were 103 deaths, and from consumption, 67.

PENNSYLVANIA.—*Philadelphia*, 1,064,277 : Reports for four weeks ending February 22d, 1621 deaths, of which 549 were under five years of age. Annual death-rate, 19.8 per 1000. From the principal zymotic diseases there were 217 deaths, from consumption, 245, and from acute respiratory diseases, 307.

Pittsburg, 230,000 : Reports for four weeks ending February 22d, 387 deaths, of which 124 were under five years of age. Annual death-rate, 20.9 per 1000. There were 50 deaths from zymotic diseases, 31 from consumption, and 124 from acute respiratory diseases.

RHODE ISLAND.—During the month of February there were 540 deaths in an estimated population of 306,510. Annual death-rate, 20.0 per 1000.

TENNESSEE.—The principal diseases, named in the order of their greater prevalence, in the State during January were: Pneumonia, consumption, bronchitis, malarial-fever, rheumatism, and tonsillitis.

Chattanooga,	white,	15.28 ;	colored,	10.22 :	25.85
Clarksville,	"	2.40 ;	"	24.00 :	9.00
Knoxville,	"	15.88 ;	"	24.44 :	17.01
Nashville,	"	12.00 ;	"	18.76 :	14.53
Memphis,	"	21.19 ;	"	22.26 :	21.68

WISCONSIN.—*Milwaukee*, 210,000: Reports 282 deaths in February, of which 64 were under five years of age. Annual death-rate, 16.1 per 1000. From zymotic diseases there were 50 deaths, and from consumption, 28.

INFANT MORTALITY.—Professor V. C. Vaughan, of Michigan University, in a paper read at the meeting of the American Medical Association, in June last, and published in the *Association Journal* of February 28th, 1890, concludes that:

1. One fourth of the children born in the United States die before they reach the end of the fifth year of life.

2. Derangements of digestion cause more than fifty per cent of these deaths. This class of diseases may be restricted by proper attention to the food.

3. Infectious diseases are serious in their effects upon infantile mortality. They may be restricted by isolating the sick and disinfecting clothing and rooms.

4. About three eighths of the total deaths from pneumonia occur among those under five years of age. Proper clothing and lessened exposure to extremes of temperature will do much to protect against this disease.

HEALTH OF RAILROAD MEN.—According to M. Duchesne, railroad men improve in health during the first four years, but at the end of ten years they are tired out, in fifteen they are actual sufferers, and few can remain in the service after twenty. These general conclusions have been supplemented by Dr. Lichtenberg, of Buda-Pesth, who found from examination that out of two hundred and fifty railway employés, ninety-two, or more than a third, suffered from ear disease. Engine-

drivers are especially liable to rheumatism and pneumonia, and after some years of service a certain portion of them become dull of sight and hearing. Others suffer from a mild form of spinal concussion, muscular feebleness, and continuous pains in the limbs. They are apt to develop a peculiar mental state —a sort of cerebral irritation—with excessive nervousness and morbid sensation of fear.

HAVANA'S DANGEROUS ATTITUDE TO COMMERCE is shown by the following communication :

Editor of THE SANITARIAN :

As the season approaches when the increasing heat produces a corresponding fear of disease, and the time is at hand when health and municipal authorities take special precautions against the outbreak or spread of infectious or contagious diseases, it may not be uninteresting to note down some aspects of the sanitary situation of the cities of the Southern States and of those countries lying adjacent to our southern line. It seems to be fully agreed that from one point comes the greatest danger to the South and the seaboard cities of the United States—that from Cuba, and especially from Havana—those diseases which are most to be dreaded during the heated term are most easily imported.

The regulations established by the United States Marine Hospital Service are rigorous, and seem to be faithfully carried out.

The inspection of the steamers plying between Havana and the ports of the United States is so close and searching, and the penalties for infraction so severe, that the great body of the travelling public are fully protected against a possible infection.

The steamers of the Plant Line arrive at this port at 6 o'clock in the morning. They lie in the harbor, moored to a floating buoy, not anchoring directly until one o'clock the same day, when they sail for Key West. The five or six hours are spent in discharging by lighters the passengers, their luggage, and the limited amount of cargo, and receiving a like amount on board. The ships Mascotte and Olivette are as clean as constant work and untiring vigilance can make them. It

speaks well for the care taken by Dr. Burgess, the representative of the United States Marine Hospital Service, and the officers of the line, when it is asserted that for 300 trips of the steamer Mascotte no case of contagious or infectious disease has been found aboard on arrival, nor has any person not complying with the regulations ever been permitted to land in the United States. In one case where a permit was refused, and where afterward the person went on board the ship under a false name and certificate, it was discovered before the steamer landed at Tampa, and the person was, by direction of the United States Port health officer here, returned to Havana.

This inspection and enforcement of regulations is the only protection the people have, and this is evaded by that class of spongers, fishermen, and irresponsible ocean tramps who keep up an illegal smuggling trade with the nearest coast, and whose success in their business depends upon the secrecy with which they carry it on.

Havana should be a healthful city ; and it would be but for the uncleanly habits of the citizens and the total neglect of sanitary laws, which make the name a synonym for the dreaded fever. Swept daily in three directions by the strong winds, and with a natural surface sloping to the water for all drainage, there is no natural condition why any infectious disease should obtain a foothold in a locality so highly favored ; yet the daily health reports show the presence of from five to thirteen cases of yellow-fever, besides the usual number of contagious diseases incident to a population of this size.

The reasons for this endemic character of the yellow-fever are perfectly clear. Most of the sewers are badly built and serve to collect and retain the sewage rather than discharge it. Some few of the later ones, built under the Spanish engineer officers, are good specimens of the art and are serviceable, but the irregularities in plan, the worthlessness of material, and, above all, the rascality in construction of those built prior to recent regulations for new ones, make them death-traps and worse. The fumes from almost all of the man-holes and catch-basins in the older part of the city are as deadly as carbonic acid gas ; and as it is now five months since rain has fallen, and there is no provision for flushing the sewers, the poison which flows steadily forth can be easily imagined. The

outfall of these sewers is into the harbor, nearly all inside the line from Moro Castle across to the Casa Blanca.

This harbor is like a bottle, the neck or narrowest part being about five hundred feet wide, and expanding into an area one by one mile and one half. There is no flow of tide of any consequence, the average rise being but two feet.

The sewage outflow falls directly into the still water under the wharves and there accumulates, and the harbor is gradually filling up with the concentrated extract of filth, which is death to disturb and sure disease to be in smell of. Vessels lying at the wharves lose their crews, and even when hauled into the stream carry with them the seeds of fever, to be propagated on board other craft which have had no communication with the shore. There are many singular examples of communicated contagion by air and wind related by the health officer of the Marine Hospital Service stationed here.

Another hardly less deadly source of disease is the filthy condition of the streets. The wind seems to be the only scavenger. In a residence of two weeks I have seen no attempt at cleaning the streets, and the condition of those about the markets surpasses belief. Under this hot sun vegetable matter begins to decay the instant it is cut. The supplies appear to be brought in from the country in the crude form, with no attempt to prune away the surplus and useless stalks, and the result is a mountain of rotten refuse thrown out at the nearest door or window.

The sanitary organization of the city is incomplete and inefficient. There appears to be no chief head or responsible authority with power to make and enforce necessary regulations.

There are too many officials. Each ward has its own alcalde or mayor, with a board of councilmen and staff equipment. All these are subject to the captain-general, but the endless circumlocution and detail of official red tape defeat any attempt to grasp the subject as a whole. There are many highly educated and advanced thinkers in all departments of science and the professions, men who keep abreast of the advance of sanitary progress in theory, but none who seem confident and competent enough to put theory into action. Hence the special branches which these men devote themselves to flourish, while the general health and education retrograde.

The hospitals devoted to the care of special diseases are well built and well conducted, but the prevention of disease seems to be an unknown art. In some of the hospitals the later ideas are being gradually introduced; even the destruction of noxious matters by fire instead of the old way of carrying them away is obtaining. At the Hospital of Hygiene an Engle hospital furnace has been built by the Engle Company for Dr. C. Delgardo, the director, from which some good results have already been obtained, and this will undoubtedly lead to the establishment of similar furnaces at other places.

The real reason for the low standard of public health is said to be that the Spanish Government is in constant financial straits, and has not the money for the sanitation of the city. The city is practically bankrupt. The paper money in circulation is worth only two and one half dollars for one of gold, and the people are taxed to the utmost limit to maintain life. But this question of finance is aside from my purpose and cannot be here discussed. The facts are simply these: Here is a city situated in one of the most healthful localities in the world, a hot-bed of infectious diseases and a plague-spot for all its neighbors! Of this the people of the United States have repeatedly had sad experience, and as recently as only two years ago. It remains for us to so protect ourselves, if possible, that by no chance shall it ever again happen that we shall go through a like experience. FRANCIS.

HAVANA, CUBA, April 1, 1890.

CHOLERA continues to cause much alarm in Russia. A telegram from St. Petersburg states that the Government is making strenuous efforts to prevent the cholera, which still exists in Persia and Mesopotamia, from crossing the Caucasus.

Las Novedades remarks in this relation: "If the Government of the Czar treats the microbes of cholera as severely as it is accustomed to treat the Nihilists and other real or supposed enemies of the Government, we need not fear that the terrible disease will reach us by that way." T. P. C.

LITERARY NOTICES.

THE MEDICAL ANNUAL AND PRACTITIONER'S INDEX: A WORK OF REFERENCE FOR MEDICAL PRACTITIONERS. 1890—eighth year. Pp. 620. Price, $2.75. New York: E. B. Treat & Co.

The general scope and aims of this work continue the same as heretofore, but it is in some important particulars considerably more elaborate, and in nothing more than by the addition of a chapter on Sanitary Science by D. S. Davies, M.D., Medical Officer of Health for Bristol, England, comprising a concise sketch of the growth of hygiene in England since 1832, under the spur of cholera and other epidemics demonstrated to be preventable. It is appropriately illustrated by cuts of the most approved apparatus and methods of house drainage, lavatories, ventilation, water supply, and sewerage; a summary of the most useful disinfectants and the means of applying them, and the essential features of registration in vital statistics.

The year is well known to have been eminently fruitful in *new remedies*, and to these considerable space is devoted, but not more than the nature of the subject demands, with a view to proper discrimination, together with a review of therapeutic progress, by Sidney Martin, M.D., of London, followed by chapters on Thermo-Electro and Uterine Therapeutics. But the mass of the work is devoted to "New Treatment," comprising 427 pages, the diseases and injuries alphabetically indexed, and the treatment under each described.

The work is abundantly illustrated throughout, is well gotten up in all respects, and eminently commendable to all medical practitioners.

PRACTICAL ELECTRICITY IN MEDICINE AND SURGERY. By G. A. LIEBIG, JR., Ph.D., Assistant in Electricity, Johns Hopkins University; Lecturer on Medical Electricity, College of Physicians and Surgeons, Baltimore; Member of American Institute of Electric Engineers, etc., etc., and GEORGE H.

ROHÉ, M.D., Professor of Obstetrics and Hygiene, College of Physicians and Surgeons, Baltimore; Visiting Physician to Bay View and City Hospitals; Director of the Medical Maternité; Associate Editor "Annual of the Universal Medical Science," etc. 8vo, pp. 391, profusely illustrated. Philadelphia: F. A. Davis.

As a concise manual, devoid of all redundancy and containing everything that is useful in the practice of electro-therapeutics in medicine and surgery, this is a work which no practitioner can well afford to do without. The authors are well known to be among the foremost in the practical application of electro-therapeutics, and the publisher's part is in keeping with the excellence of the text.

HOW TO PRESERVE HEALTH. By LOUIS BARKAN, M.D. 12mo, pp. 344. New York: Exchange Printing Company.

An excellent summary of the most healthful conditions, devoid of all technicalities and eminently practical in the use of universally available means promotive of health and longevity.

WOOD'S MEDICAL AND SURGIGAL MONOGRAPHS, March, 1890: Treatment of Cancer by Electricity, by Dr. J. Ingliss Parsons, London; The Dreadful Revival of Leprosy, by Sir Morell Mackenzie, M.D.; Diseases of Old Age, by Dr. A. Seidel, Berlin; Urinary Neuroses of Childhood, by Dr. Louis J. Guinon, Paris; Varicose Veins of the Lower Extremities, by William H. Bennett, F.R.C.S.; Uses of Electrolysis in Surgery, by W. E. Stevenson, M.D., London. The practical importance of these articles and the eminence of their authors will, doubtless, as they should, attract the attention of all medical practitioners who would keep abreast with progress.

PAPER ON CANCER, by C. R. Earley, M.D., read before Lycoming County Medical Society three years ago, reports several *cures* effected in his practice previous to that date by the internal use of arsenic and conium, and turpentine liniment. Those cases and many more since, we are assured by Dr. Earley, have remained well, and he continues to urge the treatment on the attention of the profession.

A DIGEST OF TWENTY YEARS' EXPERIENCE IN THE TREATMENT OF UTERINE CANCER, INCLUDING 367 OPERATIONS BY GALVANO-CAUTERY. By JOHN BYRNE, M.D., M.R.C.S.E., Surgeon-in-Chief St. Mary's Maternity, Chief of Gynecological Department, and President of the Faculty of St. Mary's Hospital, Brooklyn, etc., etc. Reprinted from the Transactions of the American Gynecological Society, 1889.

This pamphlet is the gist of an unusually large experience by one of the best observers and most careful operators. It is couched in the fewest possible words, and should be read by those who call themselves gynecologists.

LONDON FOGS. Addressed to all whom they concern, and dedicated to the London County Council, by ALFRED CARPENTER, M.D. (Lond.), D.P.H. (Camb.). Price, one shilling. Croydon: Roffey & Clarke.

This is a lucid description of a very obscure subject, which ought to be read and its teachings enforced by the civil authorities of many towns in the United States.

PALLISER'S COURT-HOUSES, VILLAGE, TOWN AND CITY HALLS, JAILS, AND PLANS OF OTHER PUBLIC BUILDINGS. By PALLISER. Folio, pp. 96, profusely illustrated. Price, $2. New York: Palliser & Co., Architects.

To public officers, building committees, corporations, architects, and others interested in the construction of public buildings, this work is of special value. It contains abundant illustrations, with descriptive text well calculated to form a basis, at least, of all needful requirements.

THE HISTORY OF FEDERAL AND STATE AID TO HIGHER EDUCATION IN THE UNITED STATES. By FRANK W. BLACKMAR, Ph.D., sometime Fellow of History and Politics in the Johns Hopkins University, now Professor in the State University of Kansas. Circular of Information, No. 1, 1890. Pamphlet, pp. 343. Bureau of Education. Washington: Government Printing Office.

Although of recent issue, this contribution is under date of February, 1889, and is, numerically, No. 9 of the series of monographs projected by Hon. N. H. R. Dawson, the pred-

ecessor of the present Commissioner of Education. The author shows the attitude of each colony and of each subsequent State toward colleges and universities, and recounts that part of the legislative and financial history which relates to advanced learning in the several commonwealths ; discusses the rise of national education, with its relation to local, and brings forward the opinions of statesmen and scholars concerning the duties and functions of the Government in public education. A brief history, accompanied by valuable statistics, is given of the various methods adopted by Congress to encourage and assist institutions of learning. But the main body of the work is devoted to the presentation in a condensed form of the plans pursued by the legislatures of thirty-eight States in the treatment of higher education. The monograph represents a wide range of research, extending from the earliest colonial records and charters to the latest revised statutes, and may be read with profit by all who would be familiar with the earliest efforts to establish and provide for Higher Education in the United States.

THE *Home Journal* has abandoned the unwieldy "blanket sheet," and appears in the more convenient size of the modern eight-page paper ; but there is no change in the tone and general style of the paper, which was established by George P. Morris and N. P. Willis, nearly fifty years ago. The stories, essays, and poetry in the *Home Journal* rank in quality with those of the best magazines ; its music criticism is of a high order ; the theatrical and art departments are carefully written ; its book reviews and literary matter show masterly work ; while the society news is always accurate, select, and in the best possible taste. You never get a line or hint of scandal in the *Home Journal*, never a word or thought that breathes offence. The management of the paper shows not only skill and enterprise, but honesty and intelligence. It is essentially a journal for the home of refinement. That such a carefully conducted family paper is highly prosperous is evidence that good taste prevails among a large class of readers.

IN THE SLAVE-SHED.—All ages, of both sexes, are to be seen : mothers with their babes ; young men and women ;

boys and girls; and even babies who cannot yet walk and whose mothers have died of starvation, or perhaps been killed by the Lufembé. One seldom sees either old men or old women; they are all killed in the raids; their marketable value being very small, no trouble is taken with them.

Witnessing groups of these poor, helpless wretches, with their emaciated forms and sunken eyes, their faces a very picture of sadness, it is not difficult to perceive the intense grief that they are inwardly suffering; but they know too well it is of no use to appeal for sympathy to their merciless masters, who have been accustomed from childhood to witness acts of cruelty and brutality, so that to satisfy their insatiable greed they will commit themselves, or permit to be committed, any atrocity, however great. Even the pitiable sight of one of these slave-sheds does not half represent the misery caused by this traffic—homes broken up, mothers separated from their babies, husbands from wives, and brothers from sisters. When last at Masankusu I saw a slave woman who had with her one child, whose starved little body she was clutching to her shrunken breast. I was attracted by her sad face, which betokened great suffering. I asked her the cause of it, and she told me in a low, sobbing voice the following tale:

"I was living with my husband and three children in an inland village, a few miles from here. My husband was a hunter. Ten days ago the Lufembé attacked our settlement; my husband defended himself, but was overpowered and speared to death with several of the other villagers. I was brought here with my three children, two of whom have already been purchased by the traders. I shall never see them any more. Perhaps they will kill them on the death of some chief, or perhaps kill them for food. My remaining child, you see, is ill, dying from starvation; they give us nothing to eat. I expect even this one will be taken from me to-day, as the chief, fearing lest it should die and become a total loss, has offered it for a very small price. As for myself," said she, "they will sell me to one of the neighboring tribes, to toil in the plantations, and when I become old and unfit for work I shall be killed."

Much life is lost in the capturing of slaves, and during their captivity many succumb to starvation. Of the remainder,

numbers are sold to become victims to cannibalism and human sacrifice ceremonies. There are few indeed who are allowed to live and prosper.—*E. J. Glave, in The Century for April.*

THE NATURAL INEQUALITY OF MEN, by Professor Huxley, is an unusually interesting article in the *Popular Science Monthly* for April, which politicians may profit by. It deals with Rousseau's idea of the equality of men in the state of nature, with applications to the recent controversy on the land question.

MEMORIAL TO MARY THE MOTHER OF WASHINGTON.—One hundred years ago this venerable woman was interred in private grounds near Fredericksburg, Va. In 1833 the corner-stone of an imposing memorial was laid by President Andrew Jackson. A patriotic citizen of New York assumed the pious task, single-handed, but meeting with financial disaster, was compelled to abandon it.

Marion Harland makes an appeal to the mothers and daughters of America to erect a fitting monument to her who gave Our Country a Father, and truly says that "the sun shines upon no sadder ruin in the length and breadth of our land than this unfinished structure."

The publishers of *The Home-Maker*, New York, of which Marion Harland is the editor, offer, as their contribution to the good cause, seventy-five cents out of every annual subscription of two dollars to the magazine sent in during the next six months. Every such subscription must be accompanied by the words, "*For Mary Washington Monument.*"

The offer is generous, and should meet with an enthusiastic response.

NESTLÉ'S SWISS MILK, we are informed, has won the grand prize at the Paris Exposition. This is the highest award in the gift of the jury, and is never conferred except for unusual merit. Nestlé's Swiss milk is condensed in Switzerland. Its superiority is evident to all who use it.

Of eighteen brands analyzed recently by W. H. Kent, Ph.D., Chemist of the Department of Health, Brooklyn, Nestlé's was the only one which contained the maximum per cent of fat—9.44—of milk that has not been skimmed.

MEDICAL EXCERPT.

THE MEDICAL CONGRESS IN HAVANA.

THE first medical congress held in Cuba, lately, was numerously attended by the profession, and has been a source of pride and gratification to all who assisted at it. Many important subjects were intelligently and sharply discussed. The *Cronica Medica Quirurgica* declares it an accomplished triumph, and one that implies a degree of progress exceeding even their highest anticipations and a signal honor to the country.

Dr. J. Santos Fernandez, editor of the *Cronica* and President of the Commission, read a thoughtful and pertinent discourse to the members on the opening of the first session. He referred to the relation of the public health on all the great problems that relate to industry, commerce, and agriculture; he dwelt upon the influence yellow-fever, which he called "that terrible endemic," might have in restricting intercourse with foreign nations. "Of what advantage," he asks, "is the fertility of the soil, with its exuberant vegetation which beautifies it, when beneath it lurks the miasm which threatens the lives of so many, unless science, with its boundless resources, can do something to limit its destructure effects?"

In considering the demography of the city of Havana, Dr. La Guardia said that, in 1849, the first work giving the mortality of that city was compiled by Dr. Angel Cowley, and published the same year. The city of Havana, according to the census of 1887, has 200,448 inhabitants, while ten years earlier, the census of 1877 gave it 198,721, showing an increase of only 1727.

The number of deaths in 1889 was 5923, or 29.5 per 1000 inhabitants. The necessity of a sufficient supply of pure water for the people was pointed out; the tables giving the deaths, births, and marriages; the crimes registered, the cases of yellow-fever and small-pox, as compared with former years, are very complete.

Dr. Montalvo said that in demography the ethnic factor cannot be ignored, for diseases and their effects vary with race

and nationalities. He further remarked that, in regard to criminality, the record of the Spaniards was far better than that of the Cubans.

The population of Cardenas, according to Dr. Mendez, is 23,405, and during the five years from 1884 to 1889 there were 3764 death, 753 a year; this would give 32 per 1000 each year. He gives interesting details regarding the mortality from infantile tetanus; in all the cases that he attended he used antiseptics in the treatment of the umbilicus and never lost a case.

T. P. C.

GASTRO-STOMIE is the term employed by Terrillon to designate an operation which he was obliged to perform on a patient for stricture of the œsophagus. The patient, who was presented to the Academy of Medicine, had been treated before the operation without success. After the stricture had been sufficiently dilated, the gastric fistula was permanently closed with sutures, and a good recovery was made.—*Gazette Hebdomadaire. T. P. C.*

POISONING INFANTS BY COWS' MILK.—Clinical remarks on this subject and its influence on the fevers of infants was the subject of a paper read by Dr. Garcia Reijo before the Medical Congress lately held in Havana. For seven years he had carefully observed the evil effects produced on children by cows' milk. Much has been said of the poor quality of the milk and of the want of care given to the vessels in which it is kept; but there is another cause which, in his judgment, is of the greatest importance, and which is rarely alluded to. "I refer," he said, "to the predisposition of some children to reject that kind of food. All children do not tolerate it equally well. Although I was at one time very persistent in recommending milk, I have been obliged to modify my opinion regarding it in some cases, and have not of late persisted in advising its continued use when I found it to disagree. I have met with a case of chronic dysentery which was evidently the result of the use of cows' milk, and which was permanently cured when the milk was discontinued.

"The quality of the milk varies with the locality, for in Havana and some other places it is dear and of poor quality,

while in other places it is cheap and much better. Many cases were cited to confirm the accuracy of his observations, and from them he forms the following conclusions :

" 1. There are infants who cannot use cows' milk, no matter what may be its quality.

" 2. Others support it tolerably well.

" 3. The symptoms found in the cases which do not digest it well are vomiting, indigestion, severe diarrhœa, acute enteritis, and cholera infantum.

" 4. The fermentation of the undigested milk produces the above symptoms.

" 5. These phenomena are observed more especially when the use of cows' milk has been imprudently persisted in, and in such case feculent substances are better tolerated.

" 6. Milk should be discontinued as soon as there is evidence that it is not tolerated.

" 7. When the health of such children is restored a return to the milk will usually reproduce the disease.

" 8. Among the fevers of early childhood, some can undoubtedly be traced to the use of cows' milk."—*Revista de Ciencias Medicas. T. P. C.*

Vomiting Treated with Resorcine.—According to the experiments of Dr. Andeer, resorcine, chemically pure, is the best remedy for vomiting, especially in diseases of the stomach. He has also found it useful in vomiting arising from central or peritheral disturbance, whether sympathetic or symptomatic in character. He has given it for vomiting caused by nephretic or hepatic colic, during menstruation, and even in the vomiting of pregnancy, and always with entire success. He has found it useful in sea-sickness and in excess of eating, drinking, the abuse of alcohol, etc.—*Zeitschrift für Therapie. T. P. C.*

Codeine and its Salts have received much attention from medical men recently. Thus, Dornblüth reports a series of very successful applications of codeine-phosphate injections for the sedation of insane excitations.

Codeine phosphate was first prepared for the drug trade on a large scale by E. Merck, in 1882, at the suggestion of Professor Hegar, of Freiburg, with a view to obtain a compound

suitable for hypodermic use, all the previously obtainable codeine salts, as well as the alkaloid itself, having proved too sparingly soluble, and partly too irritating, to serve that pur pose well. Codeine phosphate answers the hypodermic requirements excellently, being soluble in four parts water, and leaving the puncture comparatively free from irritation. (It is advisable to prepare the hypodermic solutions fresh for use each time, as they tend to generate fungi. An addition of bitter-almond water, however, is conducive toward their preservation.)

Dr. Dornblüth admits that codeine (phosphate) acts less energetically than a hyoscine preparation ; he insists, however, at the same time, that it is quite well available whenever a change of hypnotics appears desirable, and that it is, moreover, indicated in those cases where hyoscine applications are productive of hallucinations.

Codeine phosphate is also indicated prominently for the suppression or palliation of apprehensive restlessness, precordial sensations, and insomnia.

According to extensive observations by Fischer, tolerance and habituation, analogous to "morphinism," are not caused by codeine.

Fischer recommends the following formula for codeine hypodermics :

Codeine phosphate, 1 gramme (15 grains) ; distilled water, 20 grammes (5¼ fl. dr.) ; carbolic acid, 0.02 gramme (⅓ minim). Inject one half syringeful.

Schmidt, of Wiesbaden, was the first to recommend the internal use of codeine phosphate for the treatment of morphinism. If the codeine treatment be begun at an early stage, the symptoms induced by the morphine abstinence will gradually disappear, so that the codeine doses may be, in their turn, successively reduced.

A ten per cent solution was found the most eligible form for internal exhibition. The largest daily dose hereof employed by Schmidt contained 3 grammes (46 grains) of codeine phosphate.—*Merck's Bulletin for March*, 1890.

THEOBROMINE AND SODA, SALICYLATE (so-called "diuretin"). White crystalline powder, but slightly soluble in cold

water ; soluble in hot water and in warm diluted alcohol ; insoluble in ether and in chloroform.

This salt has been clinically investigated by Ch. Gram, who says that it is much more easily resorbable than the simple theobromine.

Its action is reported to be strongly diuretic, while devoid of any toxic properties, and free from the peculiar excitant influence on the central nervous system, possessed by caffeine.

Eligible form of exhibition : Powder. Dose : Single, 1 gramme (15 grains) ; daily, 6 grammes (1½ drams).

The salicylate of theobromine and soda was first manufactured by E. Merck, some time ago, at the instance of Professor Dr. Riegel, of Giessen University. Quite recently, however, this same compound has been found in the markets as a so-called therapeutic novelty, under the name of "diuretin." —*Merck's Bulletin for March*, 1890.

Acute Colds and How to Treat Them.—Dr. C. H. Stowell, of Washington, D. C., in a recent contribution to the New York *Medical Journal*, lays special stress upon the physiological function of the nose as a filtering agent, which not only protects the parts below from the irritating qualities of particles of matter as found in dust and smoke, but from disease germs. The tortuous structures over which the air must pass on its way through the nose make it altogether probable that all parts of the current of inspired air come in immediate contact with the nasal mucous membrane. It must follow that vast numbers of germs will adhere to this membrane. These germs may be those ever present in all inspired air, or those that may give rise to the gravest forms of disease. He quotes Dr. Roughton, of London, who has also called attention to this "screening action" of the nose, and believes that it greatly diminishes the prevalence of phthisis. But it must be kept in a healthy condition.

1. The nose should be kept clean.
2. All obstructions to nasal respiration should be removed.
3. Mouth-breathers invite diseases of the throat and lungs.
4. Mouth-breathers are more likely to have certain of the diseases caused by the entrance of germs in the body.

If the nose plays so important a part, how can it be kept in

a healthy condition? By promptly treating acute attacks. If the patient can be seen in the early stage, he should have at once a hot foot-bath and a bowl of hot lemonade. He should then be placed in bed and covered with blankets until copious perspiration is produced. If seen at a little later stage, and the fever seems excessive and the whole system affected, then there are two marked remedies at our command—aconite and belladonna. The tincture of aconite is best given in small doses, half a drop once every half hour for a few hours, until its physiological action is apparent. If the discharge from the nose be thin or if the throat be involved, then small and frequently repeated doses of the tincture of belladonna will give marked relief. A brisk cathartic is often indicated and generally very desirable.

In the beginning of the attack the nasal mucous membrane is likely to be dry and swollen, giving the sensation of the presence of a foreign body, causing sneezing and a sense of fulness. In this early stage the abortive treatment, already alluded to, can be relied upon, if local treatment be combined with it. Cocaine and antipyrine are almost specifics for this trouble. They can be used as a spray in the strength of one per cent of the former with four per cent of the latter. Thus:

℞ Cocaine hydrochloride..... gr. ivss.;
Antipyrine..... gr. xviij;
Sodium bicarbonate..... gr. v;
Water..... ℥ j.
M. Sig.: Nasal spray.

This should be sprayed thoroughly into the nares. The swollen membranes soon retract, and nasal respiration is free and easy. The spray should be repeated as often as the nares become occluded. If any nasal symptoms remain after the first twenty-four or thirty-six hours, it is better to substitute a spray with an oil for its base. Thus:

℞ Cocain. hydrochlorid..... gr. ix;
Aquæ..... ℥ ss.;
Ft. solutio et adde
Olei petrolei..... ℥ j;
Olei eucalypti..... gtt. vj;
Olei gaultheriæ..... gtt. iij.
M. Sig.: Nasal spray. Shake thoroughly before using.

This spray can be used morning and night for a few days only, or until the acute catarrhal symptoms have disappeared.

As atomizers cost money, and as they cannot be carried about readily, a powder may be substituted for both the above. Thus :

℞ Sodii bicarb..... gr. ij ;
Magnesiæ carb. (levis)..... ..... gr. iij ;
Menthol..... gr. j ;
Cocain. hydrochlorid..... gr. iv ;
Sacch. lactis..... ℥ jss.
M. Sig. : Use as snuff.

The most marked relief will follow the use of this powder, and a few applications will do much to abort the catarrhal attack. Its effects are immediate, highly agreeable to the patient, and continuous for a number of hours.

In the case of young children, where a powder or spray cannot be used to advantage, an ointment can be substituted. Thus :

℞ Cocaine hydrochloride..... gr. ix ;
Anhydrated lard, } .....āā ℥ ss.
Vaseline, }
M. Sig. : Ointment for the nose.

A small amount of this can be placed on the end of a feather and inserted into the nose.

A word concerning any objection that may be urged as to the use of cocaine in this manner. 1. The amount prescribed in each case is small ; especially is this true of the powder. The prescription given above will last a patient for days—in fact, his acute catarrh will disappear before all the powder is used. 2. Neither the sprays nor the powder should be continued after the first few days of the attack. 3. They should not be prescribed for chronic catarrhal affections ; for while it is true they give great relief in chronic hypertrophic conditions, yet the relief is but temporary, and their constant use may give most undesirable effects. 4. The physician should dispense his own powder, giving not over a drachm to each patient. If possible, he should dispense the sprays as well. By so doing he will retain the power to prevent any overuse or misuse of the drug.

THE SANITARIAN.

MAY, 1890.

NUMBER 246.

KEY WEST AND YELLOW-FEVER.

FROM SURGEON-GENERAL HAMILTON'S ABSTRACT OF SANITARY REPORTS, NO. 11, MARCH, 1890.

REPORT UPON THE SANITARY CONDITION OF KEY WEST, FLA.

U. S. MARINE HOSPITAL SERVICE,
KEY WEST, FLA., February 25, 1890.

SIR: In pursuance of your official order of January 13th, I left Jacksonville, Fla., on January 17th, arriving here at 4 o'clock P.M. January 18th, and have the honor to submit the following report upon the sanitary condition of the city of Key West, and results of an investigation of the causes of the recent cases of yellow-fever. This investigation was ordered at the special request of the State Board of Health of Florida:

The city of Key West covers an area of 1½ square miles of the island, which is 7 miles in length and 2 miles in breadth, and is between latitude 24° 32′ 58″ and longitude 81° 48′ 4″, 80 miles distant from the city of Havana and 230 miles from the port of Tampa, Fla. The Plant Steamship Company gives a tri-weekly mail, freight, and passenger service, between the above-named points, and the Morgan Line weekly passenger and freight service between Havana, Punta Gorda, Fla., and New Orleans, La. The entire island is a coral rock formation (oölitic limestone) rising at a slight elevation out of the waters of the Gulf of Mexico, constantly swept by strong and varying winds, and its atmosphere tempered by the Gulf Stream. The products of the soil are tropical in character, lofty cocoanut and date palms, cactus trees, wild fig, and Ind-

ian laurel and many handsome flowering shrubs thrive in the gardens ; low brush thickets of buttonwood, acacia, and mango cover the uninhabited area. The climate of this island is delightful, and is unexcelled, I think, in any section of the United States of America, with an average winter temperature of 70°, and 85° in summer. The surface of the island is generally level, with slight undulations north and south, east and west ; the waters of the Gulf being visible at either end of the public thoroughfares ; the highest points, I am reliably informed, being 10 and 15 feet above mean low water. To the eye of the visitor, looking from the deck of the steamer at a distance of some miles, the island presents a pleasing picture and gives the impression of a truly tropical region, with no suggestion that beneath the shadows of its stately palms there may lurk the infection of a disease whose subtle poison has been borne over sea and land to the threshold of the frigid zone, from the low lands to an elevation of 2000 feet. The estimated population is 20,000 souls, comprising Anglo-Saxons, Cubans (Spanish creoles), negroes, and mulattoes, the Cubans and negroes predominating. The manufacture of cigars and the sponge fisheries constitute the most valuable industries. After a thorough and systematic sanitary survey of this city, covering some weeks, and in which I was materially assisted by Dr. C. B. Sweeting, Port Physician, I find that there are many evils to condemn, and very few features in municipal sanitation to commend. The general condition of the principal streets is cleanly, but badly graded and imperfectly drained, and during the rainy season most of them are flooded, making it impossible for pedestrians to get about dry-shod. On many of the streets there are no sidewalks and no drains. The average condition of premises, as seen from the street, is among the intelligent and better classes of Americans and Spanish creoles clean and well kept, and contrasts forcibly with the filthy yards and alley-ways where the negro and Cuban population, employés of the cigar factories, are huddled together in small huts and shanties, and whose stolid apathy and utter indifference to even ordinary personal cleanliness and domestic hygiene and sanitation is apparent. In the majority of instances the garbage, refuse of kitchens, and a variety of offensive material, when not cast loose into the narrow streets or alleys, is

heaped under their wretched hovels to undergo a slow process of moist decomposition. The yards of many of these dwellings after the heavy tropical rains are inundated, the contents of the shallow cesspools, mingling with the festering garbage, are floated abroad to be subjected to the rays of a tropical sun, which promptly distills an abundance of mephitic vapors, whose baneful influence is in part happily diminished by the constant disinfection of the winds from the sea that sweep over the isle.

One of the main sources of atmospheric pollution, as well as of the soil (which, though rocky, is more or less porous), is the privy vault system which is in vogue here. These vaults are dug to a depth of 4 to 6 feet, 3 to 6 feet in length, and about 2½ feet wide, and although there are city sanitary ordinances regulating their construction, which require that they shall be cemented and emptied at stated intervals by means of an odorless excavating pump, I believe that practically in a large majority of cases the ordinance is a dead letter. I have ascertained that where the premises are small, the house occupying the greater portion of the lot, after the cesspool was filled it was covered over with sand and broken rock and a new one dug, and the practice repeated until many small yards were honeycombed with these fecal pools, and the important question to tenant or owner arose where to locate the next receptacle for human dejecta. This is certainly a deplorable system, and must be productive of foul atmospheric conditions in dwellings in a latitude where the thermometric markings range from 60° to 90° Fahrenheit the entire year. The water-supply for domestic purposes is obtained from underground reservoirs excavated in the rock and cemented, which receive the washings from the roofs of dwellings during the prevalence of heavy tropical showers of the spring and summer months. In the poorer classes of premises the privy vaults are not many feet distant from these subterranean cisterns, and during periods of drought and in badly-cemented reservoirs it is possible that by seepage from the closets the water may become contaminated with organic matter. I am of opinion that during the dry season water obtained from these reservoirs bears some close relation to the production of types of continued fever (non-malarial in character), presenting some typhoidal symp-

toms. There are within the city limits several large ponds from 5 to 3 feet above low water, which, if not productive of noxious exhalations, are far from being ornamental. They contain, during high tides, salt water, and during the rainy season overflow into adjacent streets and yards. Their surfaces at the time of my inspection were covered with a variety of vegetable fungi, and borders fringed with empty tin-cans and refuse. There is little reason to doubt but that the wary and indolent Cubans and negroes who dwell near these ponds utilize them as a convenient dumping-place for the refuse of the kitchen and premises, if not for more noxious material. These places should be drained thoroughly, cleaned out, and filled with rock and sand and converted into small parks for the enjoyment of the public. The area contiguous to the wharves and ship landings is largely made-ground, where formerly the street-sweepings and house-garbage were deposited, and served as a public dumping-ground, but recent municipal action has checked this evil practice. The present dumping-grounds are beyond the inhabited area. There are several large covered drains in different parts of the city, one on Simonton Street, leading from the head of Eaton Street to the sea, and another on Angela Street, extending to a salt-pond in the rear of quarters used by the sergeant in charge of Fort Taylor. The history of sickness along the course of these drains is well known to many old residents, and as these drains frequently become occluded, their board covers are removed and the contents thereof are thrown on the street for removal by the city carts. Where this cleansing is done during the summer season it is productive of disease, and I am reliably informed that cases of yellow-fever have frequently occurred in persons recently arrived in Key West who lived upon or frequented these streets while the drains were being cleaned. It has been held by competent observers that the island of Key West is non-malarious, and it would seem that the correctness of this opinion is in a certain measure borne out by its geographical position, its soil and products. I have failed to discover during my inspection the existence of those conditions under which ordinarily malarial diseases are engendered. The greater part of the uninhabited area of the island is covered with salt-ponds and marshes subject to tidal influence, and the

character of vegetation is not that of regions where malaria manifests itself. The absence of the usual sthenic types of malarial disease renders the recognition of yellow-fever more clear and positive, and eliminates the only possible source of confusion or uncertainty in forming correct conclusions.

The history of yellow-fever in Key West (being the most exposed point in the United States) dates from a very early period. The frequent occurrence of epidemics of this disease, the recurrence of isolated cases between epidemic periods, its recent reappearance in October, 1889, and during the month of January, 1890, point, in my opinion, to but one rational conclusion—that the disease has finally become endemic in Key West. What constitute the principal factors involved in the production of this condition are matters of the first consideration : First, the very unsanitary conditions of the city yield a favorable nidus for the propagation and preservation of the germs of this disease ; second, certain classes only of the population furnish the pabulum which evinces the presence of the apparently inactive and latent poison of yellow-fever. The negro race, as is well known, enjoy a marked immunity in regard to this disease, and the adult Spanish creoles, born in Havana or other seaports of Cuba, are protected by an attack during infancy or childhood. There remains the foreign element—Europeans, Americans, Anglo-Saxons, Germans, strangers visiting the city, and the native infantile population, who, upon exposure to isolated foci of infection, develop, after the usual stage of incubation, all the symptoms of yellow-fever in a milder form. This view of the endemicity of yellow fever in Key West is advanced by Dr. John Guitéras in his report upon the "Natural History of Epidemics of Yellow-Fever" in the annual report of the Surgeon-General, Marine Hospital Service, for the year 1888. I think its correctness is strongly illustrated and confirmed by the cases which have developed in Key West during the past three months. During the earlier part of September, 1889, cases of yellow-fever began to occur in the persons of Jewish peddlers who had come direct from New York to Key West by steamer. About September 4th, Abram Hoen, Moses Goodman, and several other Jewish peddlers, were taken sick with mild but well-marked cases of yellow-fever, and on the 23d and 27th Wolff

Abraham and wife, and probably Dennis Egan, keeper of bonded warehouse, also had the disease, though of a mild type, about the same time. Then followed the case of Rev. Householder, in which Dr. R. D. Murray differed as to diagnosis with Drs. Porter and Geddings. Julius Ellinger was the next case, on October 17th, diagnosed yellow-fever by Surgeon Murray, who treated the case. Mr. Ellinger had left Havana by steamer direct from New York, and returned to Key West through Florida by rail to Tampa, and thence by Plant Line steamer to Key West—fully three weeks having elapsed since his departure from Havana. He was taken sick at the Russel House a few days after his arrival in Key West. In view of the long interval between his probable exposure to some infected focus in Havana and the development of the disease, I believe that he contracted the fever in Key West. On October 16th and 20th other cases occurred, in the persons of Hirch Brothers, senior and junior, and Garfunkle, all being peddlers, with no history of exposure other than in Key West, none of these peddlers having been away from the island since their arrival.

On December 10th Professor Taylor Lee was taken with chill, succeeded by high temperature, and died on December 21st. The history of his case as given by his wife and nurses, and the post-mortem appearances, described by competent laymen, together with the admission by his medical attendant that during his illness the urine was notably albuminous, lead me to believe that his death was due to yellow-fever. Then followed the cases of the two daughters, who were treated by Dr. J. W. V. R. Plummer. On January 2d ultimo, Mabel Lee, two years old, was taken with chill, and presented all the symptoms of yellow-fever—lack of correlation between pulse and temperature, paroxysm lasting three days, albuminous urine, icteroid sclerotics and skin, irritable stomach, subnormal pulse in convalescence. Marie Lee, five years old, was taken with similar symptoms on January 9th. Finally, Mrs. Lee was taken sick about the 14th or 15th, and, in company with Dr. Plummer, who was the attending physician, and Dr. Sweeting, I saw her on the morning of the third day of the attack, with all the symptoms of yellow-fever. I tested the urine very carefully, and obtained, by the "ring test," and

by heat and acid, 10 per cent albuminous deposit. The course of the attack was not severe and she recovered, as did all of the cases mentioned, with the exception of Professor Lee. All these cases occurred in persons who had become residents of Key West during the past two years, coming from different parts of the United States, none of whom had been away from the island during that time, or visited any port of the West Indies known to be infected.

After a close and thorough investigation of their history it has been impossible to trace their illness to exposure to any "imported fomites." There is no doubt but that there exist in Key West isolated foci of infection to which these persons were exposed, and, as a result, contracted yellow-fever. The exceptional mildness of the winter season has, together with propitious unsanitary conditions, favored the manifestation of the latent poison of the disease, and I believe that only a thorough and vigorous cleansing of the city will rid it of the strongholds of disease, which will otherwise increase in number, and during the summer season develop the epidemic state, unless the municipal government of Key West begins at an early date to rid their rich and growing city of this "pest of the tropics," which was originally introduced on their island by infected vessels and by their creole industrial classes, but which, owing to years of criminal apathy and sordid indifference to the simplest laws of sanitation, has become (finding a congenial nidus in the filthy inhabited areas) at last domesticated.

The city of Key West is the only point in the United States that continues to harbor this "dreaded infection," and is coming to be noted as a great manufacturing centre of the fragrant "conchas, principes, and regalias," and also the distributing focus of yellow-fever fomites. A formidable rival of Havana in the manufacture of tobacco, she will soon enjoy the unenviable reputation, from the view of the sanitarian, of an equally active competition in the production of the "microbe." As long as her citizens are willing to live without the adoption and execution of such modern sanitary reforms as scientific sewerage, good drainage, abundant and pure water supply, cremation of garbage, well-graded and clean thoroughfares, public parks, improved domestic hygiene, so long will her sister cities on the mainland secure the dollars of the

tourist, invalid, and capitalist. A system of sewerage, which seems entirely practical and efficient, is contemplated by the present municipal council, who were especially appointed to carry out the needed sanitary reforms, and the taxpayers should demand that the work be commenced and completed as soon as the funds voted for that purpose are obtained. The city has issued bonds to the amount of a half million, which is to be devoted to this general sanitary improvement.

In concluding this report I cannot refrain from expressing as my conviction that yellow-fever is a preventable disease, and that its intimate relation to foul and filthy conditions of soil in towns and cities is no longer a surmise, but a fact, and that this city has become temporarily an endemic centre from such conditions, and will so remain until they are removed.

The map, kindly executed for me by Mr. Woodward, City Engineer, shows that all the cases of yellow-fever occurred within a radius of five squares, and that this is probably the present circle of infection, though there are doubtless other foci. The policy of concealment of cases of this or any other infectious or contagious disease by medical men, or the subterfuges of "cooked up committees of investigation," whose members are chosen with a view of catering to political and popular prejudice, and health officials whose tenure of office depends upon political influence, cannot be ignored or condoned by the State or national health authorities. The results of this practice subject the communities where they are tolerated to unjust suspicion and to severer restrictions in commercial intercourse than would be necessary if the truth were honestly told. Loud denunciations and puerile threats by the people, misled by political demagogues or their pliant tools, against a legally constituted "health board," cannot alter facts or the diagnosis of medical men who are eminently competent to decide upon the true character of this disease. The people of the United States cannot permit the city of Key West to remain a centre of infection of the "fiebre amarilla" or "fiebre perniciosa," the prevalence of which among the infantile population of the island city, and the strangers within their gates, excites no alarm or fear among the heterogeneous inhabitants of this island. The State and national health authorities will, if this condition prevails much longer,

be forced to adopt the same measures against Key West as are enforced against the infected ports of the Island of Cuba.

Respectfully yours,

J. L. POSEY, M.D.,

Sanitary Inspector, Marine-Hospital Service.

INSPECTION SERVICE.

JACKSONVILLE, FLA., April 11, 1890.

Editor of THE SANITARIAN :

When leaving Havana, each person undergoes a personal examination by Dr. Burges, the Health Inspector, and none are allowed on board the Plant Line steamers who are not perfectly free from any infectious or contagious disease. After April 15th the quarantine is rigorously enforced, none then being allowed to leave who have not had the fever, or whose record is such as to show beyond any doubt that no possible chance of contagion exists. The passage to Key West is a short run of seven hours, and occasionally is very rough, the ships of the Plant Line carrying little or no cargo and no great number of passengers at this season. On landing at Key West from Havana the passengers are examined by the health officers, all small baggage is inspected, and all trunks and large packages are taken in charge and deposited in the room for fumigation. At ten o'clock the next day the passengers having trunks attend the office for examination of these, and afterward the packages are opened and left for twenty-four hours exposed to the fumes of sulphur. The great quantity of clothing and bedding brought over by the Cuban cigar-makers employed at Key West makes this fumigation a necessity at all times of the year.

Key West is a low, small island on the outer edge of the Florida reef, and its southern shore is swept by the Gulf Stream. The city contains about 22,000 population spread out over an area of two miles square. There are no sewers, provision for the removal of night soil being by excavating and dumping into the water off the south beach. The character of the larger part of the population (negroes and Cubans) makes it difficult to enforce any sanitary regulations. These people have always lived in the midst of filth and have no knowledge of any other way.

The garbage and refuse is thrown into the street or alley, or carefully put out of sight under the house, there to remain until the heap becomes too large to escape the notice of the Inspector.

This practice, taken in connection with the foul condition of the privy-vaults, and the fact that the water-supply is from underground reservoirs, filled by rain during the spring and summer months, and liable always to contamination by the seepage of water through the porous rock, or by the introduction of disease germs through the air, accounts for the continuous presence of the filth diseases generally and the seasonal recurrence of yellow-fever.

The municipal authorities have finally awakened to a recognition of affairs, and an effort is being made to introduce the West system of sewerage, which seems to be perfectly adapted to the wants of such a city. The city has negotiated bonds to a large amount, and will introduce the West system, and also provide for the disposal of garbage by adopting the Engle Garbage Crematory Furnace, both of these needed reforms being now under consideration for immediate action. Unless the city does act immediately and with vigor and resolution, there can be no doubt of the visit of the yellow-fever again this summer. Everything points to this. The reports of the U. S. Marine-Hospital Service advance the idea that the fever has finally become endemic in the city, and though this is denied by the local authorities, the investigations of the State Board of Health of Florida, and the evidence of those best situated to know the facts, seems to bear out this assertion.

The peculiar geographical situation of Key West, the crossing-point of commercial lines of ships and steamers to all parts of the Western Continent, its close business relations with Florida through the Plant Line, with New York, Mobile, and New Orleans through other lines, makes it the more imperative that no effort be spared to make this a clean and more healthful town, and unless the best sanitary measures are taken, and the fears of contagion removed, it may become necessary to take the same precautions against Key West as against infected ports of Cuba and the West Indies, or stop communication altogether.

Port Tampa, where the steamers land, is a long pier built out into the shallow gulf for a mile. At the end of this pier is the famous Inn, the resort of tourists and the headquarters of fishermen. On the landing of steamers the usual Custom-House inspection is made, but no special health examination or fumigation of baggage is required.

Tampa (or the old city) is ten miles up the railroad at the head of Hillsborough Bay. This town has grown remarkably within three years past, having trebled its population and buildings. The sanitary growth has not kept pace with the increase of population. There are no sewers and an imperfect system of garbage disposal. The city has just issued bonds for a large amount to be used for paving and lighting, and has now provided for the construction of a large Engle garbage cremator, which will be built during May. In connection with this the pail or bucket system of collection of night soil is to be used, which will afford a satisfactory solution of their most difficult sanitary problem.

Yours truly,

FRANCIS.

THE ECONOMICAL DISPOSAL OF ASHES AND OTHER CITY REFUSE.

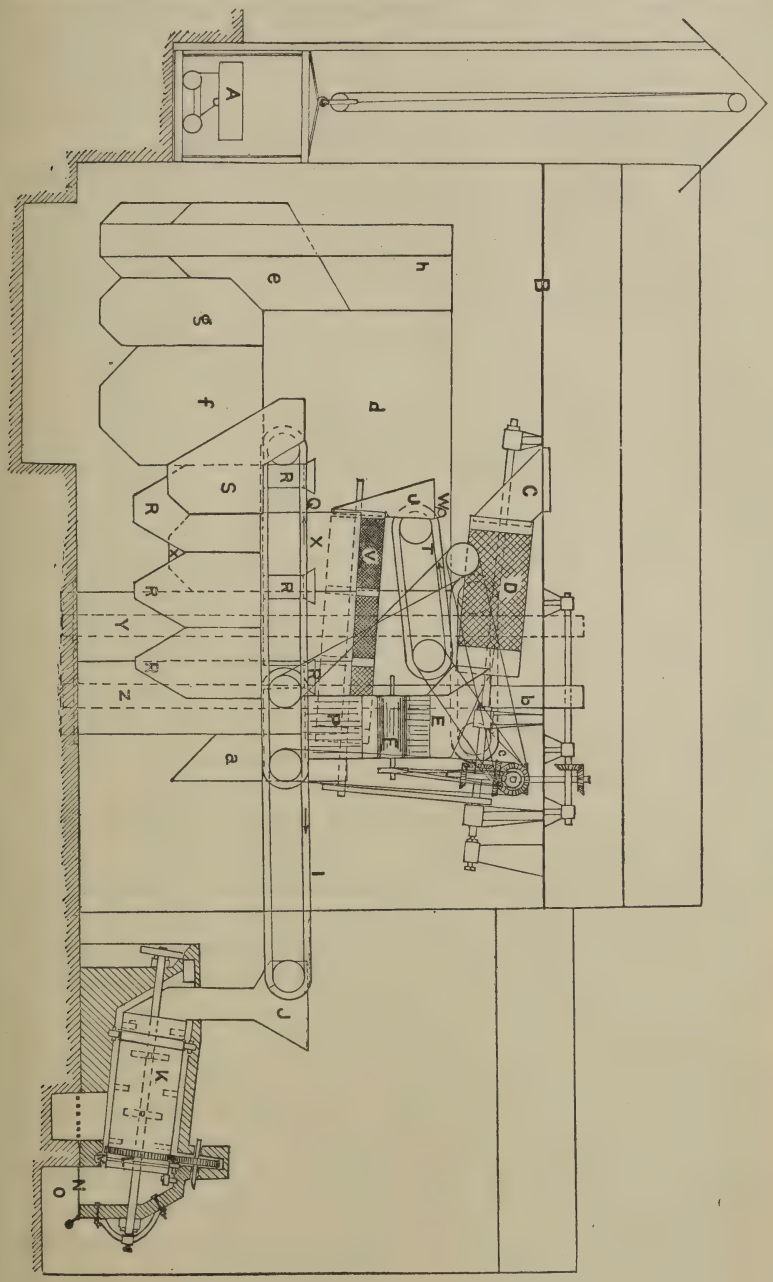
By WOLCOTT C. FOSTER, C.E.

FROM time to time notices have appeared in the papers speaking of the efforts of various persons to separate the useful ingredients of city ashes and refuse from that part which is absolutely of no value. So far as I can learn, these attempts have met with indifferent success, though there is no reason why such an enterprise, if properly conducted and with the right kind of machinery, should not prove very profitable. In ashes as they are deposited at present on the dumping grounds of our larger cities, and especially where anthracite coal is the fuel, we have what might be considered a very rich ore indeed. It is already crushed and usually in an excellent condition for treatment. Of course its useful constituents are many, as we shall soon see, and they form a considerable part of the bulk

of the crude material. Several years ago, while crossing a piece of ground that had been filled in with ashes, I was much impressed with the large amount of valuable material lying there, and was led to design the following combination of machinery for its economical mechanical separation.

The following drawings represent side and end elevations of the machine devised for sorting city refuse.

The carts used in gathering the ashes are backed to the car *A*, as in the side view, and their contents emptied into it. The car holds about two cart-loads. As soon as it is filled it is raised on the elevator to the floor *B*, along which it is run upon a track to the hopper *C*, into which the ashes are dumped. They pass into the inclined revolving screen *D*, which is of such a mesh as to retain the tin cans and larger articles and still allow the stuff containing nearly all the cinder to pass through. The materials retained by the screen, such as rags, paper, sticks of wood, straw, iron (mostly tin cans), pieces of lead pipe, glass bottles, shells, bones, pieces of rope, twine, carpet, bagging, old rubbers, shoes, hats, large stones, etc., pass through the chute *E*, and over the revolving cylinder *F*. This cylinder is covered with sheet-brass and has a number of electro-magnets within, so connected with a commutator that as each eighth of the circumference passes the lowest point in its revolution, it becomes demagnetized and remains so until it goes beyond the point *G*, when it again becomes magnetic. By this apparatus all of the iron is separated and falls upon the inclined plane *H*, and thence upon the conveyer *I*. If any of the pieces of metal happen to become magnetic enough to persistently adhere to the cylinder, they will be detached by *G*. The iron, consisting mainly of tin cans, is carried by *I* to the hopper *J*, from which it is automatically fed into the revolving furnace *K*. Here it is heated to the proper temperature, and at the same time strongly agitated, so that any solder which may have been used in joining any parts together is melted and jarred off, falling into the bottom of the cylinder and escaping by the slot *L* into the trough *M*. The solder is then led by this trough into a large iron pot, where it is allowed to collect until a sufficient quantity has accumulated. An examination of it is then made and the requisite quantity of tin or lead added, as the case may be, to bring it up to the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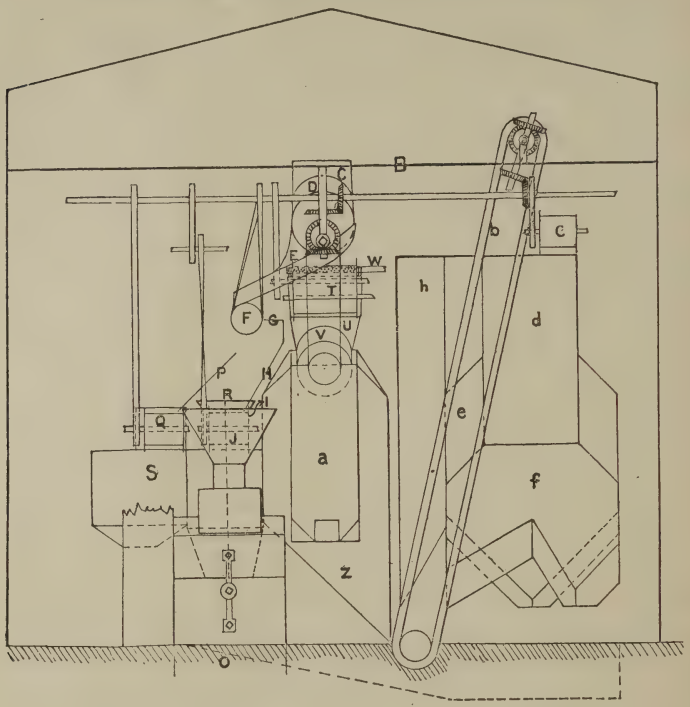


desired standard, after which it is cast into bars or pigs ready for the market.

The iron passes out of the end of the cylinder and falls upon the counterbalanced door *N*. As soon as the weight becomes enough the door opens and the load falls into the pit *O*. The door then immediately closes and the operation is repeated. The iron is removed from the pit, to be used for making sash weights or any other purpose that may be found desirable.

The balance of the material passing through the chute *E* is not affected by the magnets, and consequently falls upon the inclined plane *P*, and thence upon the conveyer *Q*. As the various things are carried along upon the conveyer everything of value is picked out by boys stationed along the side of it. Each boy has certain classes of material to pick out. The different classes are thrown into the bins *R*, each class having a separate bin. The substances having no value fall into the bin *S*.

To return to that part of the ashes which has passed through the screen *D*. This portion contains essentially all of the cinder, the fine ash, and many of the smaller stones. It falls upon the conveyer *T*, and is carried to the hopper *U*, from whence it is fed into the screen *V*. As the stuff falls into *U* it is sprayed with water by the pipe *W*, partly to prevent the making of dust, but mainly to enable the sifting to be better done. Both of the screens *D* and *V* are encased in dust-proof boxes, not shown on the drawing.

The screen *V* is divided into three parts, each of which is covered by screens of a different mesh. The first or one nearest the hopper is, of course, the finest, and separates out all of the fine ash and cinder. The material passing through this part of the screen falls into the bin *X*, and together with that in the bins *S*, *a*, and *g*, may be used for filling.

The second part of *V* has a somewhat larger mesh, while the third part has a mesh nearly, but not quite, equal to that of *D*. The object of these last two sizes is to separate the cinder-bearing material into two parts or grades, for greater convenience in treating with the coal-washer to be described later on. The respective portions fall into the bins *Y* and *Z*. That material—such as garbage, etc.—which has been forced through the screen *D* by the weight of the superincumbent mass, and of which the greater part is of no value, passes from the end of the screen *V* into the bin *a*. The coal-bearing matter is taken from the bins *Y* and *Z* by the elevator *b*, and carried up and dropped on to the conveyer *c*, by which it is taken to the hopper of the coal-washer *d*. Here, by the aid of water, the cinder or partially burned coal is separated from the slate, stones, glass, garbage, and other substances which may accompany it.

The elevator *b* is so arranged that it may be moved along the shafts to which it is attached, so that it will empty, say, the bin *Z* while the bin *Y* is filling; then when the bin *Z* is empty it is moved along so as to take the material from *Y* while *Z* is filling. The coal from the washer goes into the bins *e* and *f*, each size having its own bin, and is then ready for the market. The stones and other waste fall into the bin *g*, while any garbage or light substances go into *h*.

All the bins containing final products have sliding or trap-

doors so arranged that a wagon may be placed underneath them and loaded by merely opening one of the doors and allowing the contents of the bin to fall into it, thus dispensing with all extra handling.

It is calculated that from 30 to 60 per cent of the mass of the ashes as received would be merchantable. If such is the case, one can readily see that the saving in the cost of towage alone, in removing the ashes from a city like New York, would amount to a very handsome sum in a year.

If now the rag-pickers can be prevented from overhauling the ash barrels, the percentage of available useful material will be greatly increased, and likewise so will the profits. In order to accomplish this end, and also to keep the streets much cleaner, especially in windy weather, it is proposed to supply the various houses with iron ash barrels of special design, having a cover which, upon being closed, is fastened by a spring lock. These barrels would be furnished either free or at a very small price, on condition that the cover be closed before the barrel is placed upon the sidewalk. The ash collectors would have keys with which to unlock the covers, so that the barrels could be emptied into the carts.

By this means the streets of the city would be kept in a much cleaner and better condition than at present.

The intention is to have stations similar to the one illustrated established at different points in the city, so as to bring the haul within a reasonable distance.—*Engineering News*, March 15th, 1890.

TOMATO-POISONING.*

By William A. Mills, D.D.S., Baltimore, Md.

I desire in this paper to call the attention of the profession to a new disease, which, after many years of experience, I have discovered to be and have named tomato-poisoning.

Of necessity I shall be brief in details, leaving the history of

* Read before the Maryland State Dental Association, December 5th, 1889.

its discovery for some future paper; nor will I attempt any explanation of its pathology, but will leave it to others to philosophize upon its phenomena.

Symptoms.—At first the pain is rather indistinct, only manifesting itself in an uneasy discomfortable feeling, being more pronounced as evening approaches, and most acute at night. These symptoms may continue for days or weeks before the patient seeks relief from the agonizing pain which follows. Pain is rarely ever localized, but is made manifest by all kinds of reflex conditions. Patient cannot take anything sweet, even moderately warm or cold, into the mouth without causing the most intense agony. Going from the house into the open air, or from one room to another, where there is but a slight difference of temperature, produces the most acute paroxysm, sometimes seeming to proceed from an exposed or inflamed nerve, centring in one or more teeth in the same maxilla, or both; then apparently jumping from tooth to tooth, and then, by reflex action, causing neuralgia of the neck, head, ear, or angles of the jaws, alternating from point to point with the swiftness of the electric current. The duration and intensity are governed by age and temperament of the patient.

Diagnosis.—Upon the most careful examination of the oral cavity we fail to find any decay in the tooth the patient complains of, nor in any others in which reflex action could be supposed to play any part in the distressing symptoms. No response to concussion, no deposit of any kind, on any part of the teeth. All indications of pyorrhœa alveolaris absent, rarely any devitalized teeth; in general, the gums and associated parts apparently normal; mouth clean and properly attended.

But, on very close examination, we discover around the necks of the superior molars (but rarely the inferior), particularly manifest on the palatine surfaces—and even recession of the gums, about an eighth of an inch wide, as even and clean cut as though done with the most accurate mathematical precision—that the denuded surfaces are clean and white, in striking contrast with the surfaces above the line of original attachment of the gums.

If we place a steel instrument anywhere along the line of the

recession, touch it with the finger-nail, or blow air upon it from the syringe, the patient exclaims in agony. So far, all remedies have failed to effect a cure, except the absolute prohibition of tomatoes as an article of food. All the foregoing pertains only to patients from eighteen to twenty-five years of age. With older patients the disease proves more serious. In its first stages all the symptoms of the younger are manifest, lasting about two or three weeks, when the tissues surrounding the tooth or teeth affected shrink again to their normal position, but do not become attached to the teeth as in the case of the younger. About the fourth week the gums surrounding the necks of the teeth show a slight thickening of tissue, the color of which resembles the line of lead-poisoning. The slightest pressure of the tongue causes great pain, apparently deep-seated in the maxilla; the sensation imparted to the tongue, when touched by it, is that of something foreign and glassy. About the fifth week the teeth begin to loosen, the alveolar wall is absorbed, and in some cases caries of the roots takes place. About the sixth week the tissues collapse, when we have a condition resembling that of cancrum oris or arsenious-acid poisoning.

At this point the disease has reached its climax. If the tooth does not fall out from lost attachment, it must be extracted to give relief, which will be but slight, as all pain does not cease for days afterward. Prohibition of tomatoes gives no relief in these cases; all remedies have failed to give even temporary relief, nothing but extraction effecting a cure.

Patients rarely lose more than one tooth the same year. The disease is most prevalent during the wet seasons. This is no doubt due to the greater amount of acid contained in the tomatoes. The disease never attacks a devitalized tooth. One great peculiarity about the disease is that, during the whole process of absorption, there is almost a total absence of fœtor. In diagnosticating this disease do not confound its symptoms with that produced by grape and tomato sore mouth; always hunt for the recession of the gums on the palatine surfaces of the superior molars.—*International Dental Journal*, April, 1890.

THE OVERSHADING OF OUR HOMES.*

By W. Thornton Parker, M.D., of Newport, R. I.

In searching for information in preparing this paper as a protest against the overshading of our homes in towns and villages, I am surprised to find that so very little has been written on this important subject.

Dr. Vaughan's admirable essay, published by the American Public Health Association ("Healthy Homes and Foods for the Working Classes"), sums up in a few words of caution the dangers from damp soil and insufficient sunlight; but it seems to me that more particular attention should be directed toward the value of attention to details in the surroundings of our homes.

The duties of the medical profession are mostly employed in the relief of immediate suffering and disease. The surgeon and the physician are actively engaged in the effort to save from impending death, and advice concerning hygiene is by no means so frequently sought as it should be, although a great improvement in this respect is very noticeable. The labors of hygienists and sanitarians are being more and more appreciated by the public, and the great work of the American Public Health Association and of our State and local Boards of Health is doing incalculable good for the nation, and increasing health and comfort and length of life. Sanitary science has robbed disease of much of its strength and terror. The great work accomplished may not have received the commendation it has deserved, but it is nevertheless a comforting fact for those who have toiled for the public good, that a certain amount of success has attended their unselfish efforts. The study of sanitary science and the faithful discharge of the duties we owe to the public at large, is never lost sight of by the medical profession, and when we consider that most of this advice and labor is a gratuitous gift to the

* Read before the American Public Health Association, at Brooklyn, N. Y., October 22d, 1889.

people of the communities in which they live, and that often ridicule and blame is the only return for it all, we have a right to feel that our profession is a noble one, and our calling worthy of our most faithful efforts.

The sanitary surroundings of our homes, where our families live and are reared, ought to be as nearly perfect as it is possible to make them.

The grounds should be well graded, drained and free from stagnant water, and sufficiently dry and wholesome, and trees and bushes should be well thinned out, lest they be the means of preventing the free access of sunlight, without abundance of which no family can be either truly healthy or happy. Every bedchamber must, if possible, be so situated that abundance of sunlight can enter it for some hours daily—in clear weather—and especially is this true of the nursery, where the greatest amount of sunshine is needed and where its life and health giving rays will most surely make its value recognized in cheerful dispositions and in healthy bodies.

"The considerable increase of numbers means always war upon those pristine conditions of purity which exist in the elements before man's interference upsets the regulating and well-balanced alchemy of nature." (Dr. Ames's "Some Sanitary Problems of Massachusetts," Boston, *Medical and Sanitary Journal*, July 6th, 1882.)

"Men are so accustomed to look upon disease as an unavoidable evil that the idea of preventing it by any means of their own seems to have never distinctly occurred to them until within comparatively modern times. Preventive medicine, as it has been called, is one of those things that are theoretically approved and too often practically neglected. No one doubts its importance." (Dr. Tracy in Ziemssen's "Cyclopædia of Medicine," vol. xix., p. 573.)

An important difference between men and animals is found in the extent to which he will sacrifice a present pleasure or convenience to secure a future good or to avoid a future evil.

This is especially the case as regards matters affecting health.

When a man begins to take special precautions as to his diet and exercise, having in view rather his future health than his present comfort or tastes, he has in most cases already begun to suffer from the effects of his imprudence, and does not

commence a hygienic course of life as a perfectly sound and healthy person. The same is true for a community. It will not usually submit to the burden of taxation necessary to secure needed reforms until the neglect of these things has resulted in such an amount of disease and death as to forcibly call attention to the matter. The result is that the burden is far heavier than it would have been had the work been undertaken in proper season.

"When a State or municipality has so far advanced in civilization as to consider it desirable to take measures to protect the public health by preventing individuals from polluting the air or water liable to be used by their neighbors, the services of the medical profession are usually called upon." (Pepper's "System of Medicine.")

This subject is one of national importance, and concerns not only the prosperity of the people in a pecuniary sense, but is of greater importance in relation to sanitary matters and the general protection of health. Concerning the preservation of our forests it would be difficult to write too much, and everywhere there should be a desire to preserve and protect them. We are witnesses this year of the terrible calamities resulting from the wholesale destruction of our forests, but perhaps we do not sufficiently consider that the general climate suffers from this cause, and that indirectly much of disease and death results from the wanton destruction of the trees, so essential in the general condition of healthful landscape. It has been hoped that the Government would make some practical efforts to protect the forests.

For many years our people have given considerable attention to this subject of forest culture, but instead of exercising their influence in the direction of forest protection and increase where it is most needed, many seem to content themselves with planning "arbor days" and employing our school children in planting trees and shrubs in parks and school grounds and streets of our cities and towns. To witness the faithful efforts of our children as they plant the trees where sunlight is most needed, one cannot help feeling that oftentimes these efforts are sadly misdirected and the theory taught is not the true one. This love for the beauty of foliage is right and it is natural, and properly guided is to be encouraged, but it has

undoubtedly been only too often extravagantly bestowed, and the societies formed for this purpose are not always under the direction of the wisest, and the planting from a sanitary point of view has not yet received much attention. To set out as many trees as possible seems to be the object, and this is limited only by the means and the amount of land at their disposal. The poem of "Woodman, Spare that Tree" has won a strong place in the hearts of the people, and while whole forests disappear as if by magic, in ruthless waste and in serious menace of health and life, the tree in the town, whose roots are bathed in poisonous soil, and whose branches are filled with deadly vapors, and whose leaves repel God's glorious sunshine, stands triumphantly a delusive ornament and a dangerous menace. So much has this natural love for the beauty of foliage been misdirected that many sicken and die from overshading—even as many must also suffer from the wanton destruction of our forests.

The past nine months of this eventful year of 1889 have been remarkable in the lessons they have furnished sanitarians and hygienists. As might well have been expected, the past ten or twelve weeks have furnished a large death-rate from causes preventable, which must act as a warning for all who are interested in the welfare of the country. I do not hesitate to affirm that this death-rate is owing to the overshading of our homes in very many instances. Each community has its proportionate share of value in health and homes. Whatever diminishes this value is a direct injury to that community. Overshading is a serious fault, and directly lessens the value of real estate, and noticeably increases disease and shortens life.

These facts should receive careful and positive attention.

Vegetation produces a great effect upon the movement of the air. Its velocity is checked, and sometimes in thick clusters of trees or underwood the air is almost stagnant. If moist and decaying vegetation be a coincident condition of such stagnation, the most fatal forms of malarious diseases are produced. A moist soil is cold and is generally believed to predispose to rheumatism, catarrh, and neuralgia. It is a matter of general experience that most persons feel healthier on a dry soil. In some way, which is not clear, a moist soil produces an unfavorable effect upon the lungs. A moist soil influences

greatly the development of the agent, whatever it may be, which causes the paroxysmal fevers. In ground which has been rendered dryer by drainage, Buchanon has shown that there has been a diminution in deaths from phthisis. (Parkes's "Hygiene," p. 351, *et seq.*) Houses overshaded are not healthful, no matter how commodious or well built they may be. Too many trees near sleeping and living-rooms exercise a very injurious influence and induce various diseases, notably rheumatism, heart disease, consumption, general debility, and anæmia. It would seem as if these truths must be too well known to need any statement, and undoubtedly the members of this Association, at least, have long been familiar with the evils I am endeavoring to picture. But it has seemed to me, in view of the increasing foliage of our towns, necessary to call them again to your remembrance and to ask you to consider the whole subject as one well worthy of the attention of those interested in American public health. A journey through many of our towns during the past nine months, and an experience covering twenty years of professional investigation, have convinced me that this most undesirable condition of overshading is only too common, and has become a positive injury in almost every direction.

The bad results are, in point of fact, much more serious than most people seem to be aware of; indeed, the ignorance or indifference generally noticeable whenever sanitarians make a move in the interests of public health is deplorable.

A soil loaded with roots and densely shaded is unfit for man to live upon constantly, and is certainly no place for a permanent home.

The air entering the bedrooms and living-rooms from such surroundings is chilly and dead, and is not at all suitable for respiration. Such an atmosphere cannot bring health to invalids, and is dangerous to the well. It is invariably productive of sickness and even death, especially among children and those of feeble constitution.

As man pales, sickens, and dies without the blessing of the sunshine, so, too, the earth deteriorates and becomes unfit as a safe resting-place for man if it is deprived of the requirements of nature. It frequently happens that physicians are called to prescribe for ailing people who seem to possess every

comfort and luxury, and yet who are really perishing because their houses and grounds are overshaded.

These people, who live in such houses, are always cold and miserable, needing extra clothing and expending great quantities of fuel in order to obtain the needed warmth and to dispel the deadly chill. Artificial heat can never be compared reasonably with the pure, life-giving sunshine, and human science can never discover a substitute for the divine light of health and life.

Where houses are overshaded the nervous system also suffers, as well as the general bodily health; mental disturbance, melancholy, and madness are to be apprehended from such dreary surroundings.

No one will pretend that the sanitary condition of the majority of our summer resorts are at all equal to what they should be, or to what the public has a right to demand.

As a local board of health has a right and duty to close a house injurious or dangerous to health and life, and to forbid its occupancy until reasonable sanitary requirements have been observed and causes of danger removed, so it would almost seem to be a reasonable inference that a national board of health should have power to discipline summer resorts and other localities, and prevent the seekers for health and pleasure from risking their own and their children's lives in places desperately neglected, unhealthful, and dangerous.

Many such places exist, where overshading is the greatest obstacle to needed sanitary reforms, and where, indeed, little can be accomplished for the future sanitary improvement of the place until the axe has been given full sway and sunlight admitted to disinfect the foul earth.

> "Oh, that one ray of golden light
> Could pierce this never-ending night!"

cries the prisoner in his dark and dreary dungeon. Can we not as physicians feel the warmest pity for those who are deprived of the blessed sunlight? Do not the stories of the captives and victims of Russian cruelty appeal to us more strongly when we think of their dark and sunless existence? Light and life are the divine gifts; death and darkness the portion of those who hate the light.

We must admit, then, that the evils to which we have referred cannot be overestimated, and they are certainly serious enough to arouse the attention of the medical profession to contend against them. We can readily understand that the beauties of the foliage which are so justly admired are often attained at great loss of health, and even loss of life itself; and undoubtedly consumption, that most cruel and dreadful disease of these latitudes, is promoted in countless instances by overshading our homes, our house-yards, and our streets.

Every intelligent man who loves his family and recognizes his duties as the responsible head of a household must occasionally ask himself whether or not the house he is occupying is safe for those he loves better than himself. All should be keenly alive to the importance of proper sanitary surroundings, and nothing should be neglected and no vigilance spared to make the homes as secure against disease as against the intrusion of burglars.

A happy, healthy home, with God's glorious sunshine within and without, and the sunlight of children's smiles at the fireside, is a reward for our vigilance and duty worthy of our most constant devotion.

CHOCOLATE AND COCOA.

By A. N. Bell, A.M., M.D.

The introduction and common use of the terms "coca" and "cacoa," applicable to medicinal substances, have had the effect of confusing people's minds with regard to the source and preparation, and, in some cases, creating a prejudice against the use, of the wholly different substances—chocolate and cocoa.

The medicinal wine of coca and the powerful alkaloids and nerve stimulants, cocaine and hygrine, are prepared from the leaves of *Erythroxylon coca*, a shrub indigenous to Peru and Bolivia, wholly different to *Theobroma cacao*, a small but beautiful tree, which grows luxuriantly both wild and cultivated in the northern parts of South America, Central America, Mex-

ico and the West Indies, from the *seeds* of which chocolate and cocoa, and (from the oil) cacoa ointment or "butter," are prepared.

When the Spaniards first visited Mexico, four centuries ago, they found the natives using *chocolatl.*

It was introduced into Europe as early as 1520, and has since been more or less extensively used in every civilized country. Linnæus was so fond of it, that he gave to the tree from which it was obtained the name of *Theobroma*—food for the gods.

Chocolate and cocoa are only two forms of the same substance. The tree twice in the year yields a crop of reddish spongy fruit, shaped somewhat like a cucumber; the ripe fruit being collected at the decline of the moon, the tree continues its yield for twenty or thirty years. Each fruit or pod contains from six to fifty beans—usually about twenty—and there are from ten to twenty pounds of such beans from each tree at each crop. The beans are usually about the size of large almonds; they are frequently (from a confusion of language) called indifferently "beans," "seeds," "nuts," "berries," and "fruits," but their character will be better understood by regarding them as beans contained within a pod. They are generally picked out and dried for exportation.

Besides the beans, the pulp contains a creamy and cordial juice; and, by steaming and pressing, the beans will yield one third of their weight of a kind of butter, to which the richness of cocoa is due.

For preparing the beverage-material, the beans are exported in their original state, to be converted into cocoa or chocolate by a manufacturing process. They are first roasted in slowly rotating ovens, then broken by machine into such a state that the husks may be separated from the kernels by a blast of air, and they are afterward treated and beaten and converted into a pulp by means of their own oil. The pulp, when ground between mill-stones till it assumes a consistency something like that of treacle, is in a state to receive any of the modifications that will fit it for the market. It may be "plain cocoa," or "homœopathic cocoa," or "vanilla chocolate;" it may have arrowroot, or sago, or sugar mixed with it; or, if the manufacturers be tinctured with roguery, there may, perchance, be bean-meal or other adulterants mixed with the pulp. The

pulp, when fully prepared in any of these diverse ways, is cast into large moulds ; the cakes thus produced are cut into minute shreds by machine, and the shreds are rubbed, sifted, and packed for sale.

The preparations of cocoa and chocolate made in France are more numerous than those usually made in England or the United States : they comprise vanilla chocolate, milk chocolate, chocolate bonbons, chocolate papillotes, chocolate crackers, chocolate pastilles, chocolate with taraxacum or with sarsaparilla, chocolate with tar—in short, there is no end to the list ; for once admit the principle of mixing the cocoa with vegetable infusions, or decoctions, or essences, and the variety becomes interminable. The French limit themselves to the use of the word "chocolate," derived from the Mexican name of the plant (*chocolatl*) ; they seldom speak of "cocoa."

What are called "cocoa nibs" are the beans roughly crushed. "Flake-cocoa," also, is another name for the beans when crushed between rollers, but before anything else has been added to them.

The husk of the seed, after roasting, contains a good deal of nutriment ; indeed, so do the pods likewise ; and all three are more or less used in making cheap cocoa. The plant is certainly used in more ways than coffee : drunk as a thick decoction (made to somewhat resemble gruel), made into various confections and pastries, eaten as bonbons, etc., while a poor decoction is drunk in some places by boiling the husks separated from the beans.

While chocolate and cocoa contain an essential principle, *theobromine*, comparable to *caffein* and *theine*—the alkaloids of coffee and tea—it is much less potent as a disturber of the nervous system ; and chocolate and cocoa are proportionally more wholesome as a beverage, besides possessing specially nutritive qualities which render them much more sustaining ; and there can be little question but that its general substitution for tea, especially of that cheap oversteeped, second-edition kind, which is the too common beverage of overworked women in various avocations of life, would be promotive of health.

EDIBLE BIRDS' NESTS.

TRAVELLERS going from Hong Kong to Bangkok or Singapore by steamer pass along the coast off Annam and near a group of islands that are at once picturesque and curious. Behind them is Tourane, an ancient French settlement, the stopping-place of steamers bound for Bue and Haiphong, and destined to be an important commercial port in a not very distant future.

Several of these islands produce an important article of commerce—that is, the edible birds' nests, which have caused considerable learned discussion among scientists. They are as dear to the Chinese palate as to the Chinese purse. It is a singular fact that Annam is the only country that produces them. Why the swallows select this locality as a habitation, and no other, when there are islands apparently as eligible scattered all along the Asiatic coast from Sumatra to Korea, is a mystery that the scientists who have given the subject so much attention have never attempted to elucidate. Had Banquo lived in these times he might have given an explanation as poetic and reasonable as that which he gave to Duncan for the preference manifested by the Scotch martins for the pure and delicate air that bathed Macbeth's castle. The swallows' nests are a source of riches to the region. Their value is said to have been discovered some hundreds of years ago, during the reign of Gia Long, who promised a liberal reward to any one who would discover a new and profitable article of export within his realm. The nests discovered on the island of Nam Ngai were presented to the sovereign, who, faithful to his promise, offered a patent of nobility to the finder. This was respectfully declined, and instead a monopoly of the harvest was accepted by the discoverer for himself and his descendants. This privileged family was to pay yearly eighty pounds of the nests to the Emperor as royalty. On the other hand they were to be exempt from personal taxes, from military service, and from contributions of personal labor, such as are common in Oriental countries. They formed a family league of forty or fifty men, elected two of their number as

leaders, under the title of *gnan* and *doi*, and founded a village convenient for their commerce, which still exists under the name of Yen Xa—"Village of the Swallow's Nest." The nests are the product of a salivary secretion of the birds. As to their mercantile value they are divided into three distinct categories. The most valuable are those into which there enters a certain proportion of blood. These are called *yen huyet*. Singularly enough, they can only be produced by the birds affected with a malady which resembles consumption, and which is attended by copious hemorrhage. Nests of this kind are in great demand. They are rare, and are gathered only in the spring. Local tradition says that these birds died of exhaustion, or of consumption in its advanced stages, before the end of the second winter. Scientists being scarce among the Annamese, and the French colonists not having yet had sufficient time for observation, it is not known whether this disease is peculiar only to a part of the birds or whether the salivary secretion that causes the malady causes the death of all of them after a year or two of existence. The smallness of the quantity of these nests annually gathered—which is only three or four pounds—would seem to indicate that the disease is only partial and peculiar to those possessed of the weakest lungs. All other nests (*yan soo*) are classed as second quality. Nothing but the saliva of the birds enters into their construction. They are gathered in the spring, summer, and autumn. The spring harvest is the most valuable because it includes the two qualities. Two nests of the first quality weigh one ounce, and are worth at the place of production five Mexican dollars at current value in Annam. Those of the second quality are worth little more than half as much. The summer gathering is entirely of nests of the second quality. They are smaller and less compact. It requires four of these to make an ounce, which is worth two Mexican dollars. The autumn harvest is still less valuable. The nests are scarce and not highly esteemed. It requires seven to make an ounce, which is not worth more than $1.20 to $1.40. Experts express the opinion that this third gathering should be dispensed with, since it is worth so little and there is danger of destroying the eggs. Nearly all the nests are sold to the Chinese living in the cities of Annam and Tonquin or sent to Chinese

ports. Only the Chinese and some high mandarins of the Court of Hue, who prefer the Chinese *cuisine*, can afford the luxury. They are eaten by the Chinese cooked with flesh or with sugar, having first been cleaned of all extraneous substances by a liberal application of hot water. When cooked with fowl or game, fruit of the water-lily is added. Chinese physicians prescribe them as a sovereign remedy for diseases of the lungs, asthma, disordered digestion, and most other maladies. If they have curative qualities of the kind mentioned they probably share them with other alimentary substances containing more or less gelatine. The good qualities of the nests are estimated no doubt in proportion to the price. It is certain that, as an article of diet, they have made little impression on Western nations.

The harvest is made in a manner simple and picturesque. Sections of bamboo are thrust into the holes in the side all the way up the precipice, forming an immense ladder by whose rounds the coolies ascend, detaching with a knife as they go the nests glued to the walls. One of the family which monopolizes the industry watches meanwhile anxiously below to see that the laborer does not in gathering detach some portion of the precious nest and secrete it about his person. The operation is full of danger, and annually costs several lives. The monopoly is at this moment in danger of passing into other hands. A rich Chinese company of Hong Kong, which is building a handsome European hotel at Tourane, and which has branch houses in the principal cities of Annam and Tonquin, is offering the Hue Government a handsome bonus for the privilege of gathering the nests. The monopolists are greatly excited at the prospect of losing it, and in support of their claim are offering in evidence the very document given to their ancestors by the Emperor Gia Long. Money is needed at the court of Hue, and the ancient manuscript will be critically scrutinized by Annamese officials to discover if it is indeed a grant in perpetuity or whether there is not a chance to make a good round sum by the transfer. In the meantime the swallows, instead of seeking haunts free from invasion, come back punctually with every recurring season, regardless of their health and this increasing spoliation. Other swallows in other countries can return peacefully to their last year's nests

in the ensuing spring. These swallows of Annam must keep on pandering to an aristocratic desire, building and rebuilding their homes and giving their life's blood forever to satisfy a diseased appetite.—*Shanghai Courier.*

THE PLEASURES OF BALDNESS.

"THAT bald Cæsar the famed Roman wight" is known to have disliked being bald. Hence, his detractors declared, his love of the laurels of victory. Certainly it were a seemly thing if our elderly generals could dine out and go to the play in such laurels as they may happen to have won; for baldness, though indispensable to a young doctor or solicitor, and highly desirable in a statesman, is not coveted by the sons of Mars. A young physician, in a letter to one of the papers, very touchingly bewails the slimness of his purse and the thickness of his ambrosial locks. The "high and domelike forehead" which is admired in the busts and effigies of Shakespeare seems to this youth a feature indispensable in his profession. Yet he, of all men, should have the remedy at hand, and be skilled in the depilatory art. He has only to purchase or mix the antidote to those prescriptions for lengthening and thickening the tresses which are advertised in the beautiful decorations of our hoardings. It has been subtly remarked that many wise and wealthy persons remain bald, and hence it has been inferred that the inventions of Mrs. Allen and others are not invariably sovran. But perhaps the wealthy and the wise are intelligent enough to keep the advantages which nature or the wearing of ill-ventilated hats has given them. They know when they are well off, like the poet and orator, C. Licinius Calvus, who, after the manner of the Living Skeleton, was probably "proud of the title." The young doctor values a head early denuded at about 500*l.* a year, and, really, if he is acquainted with his business, he ought soon to possess that "shining place" where, as the elderly riddle quaintly remarks, "there is no parting." He thinks that a flowing beard has also its market value, yet he does not seem to have remarked that the owners of flowing beards are usually very bald men. It is as if nature could not support the growth of so

much hair in two places at once. By leaving the chin unshorn the head may be brought, as it seems, into the desired condition. "Even the lower animals," he maintains, have an admiring affection for the ornament which he desires, and he illustrates this by the waggishness of an ostrich. The benighted bird attempted to hatch the head of a sleeping Englishman—in South Africa, we presume. This was flattering, but embarrassing on the whole, for the ostrich is a bird with a strong sense of its personal dignity. "Hell has no fury like" an ostrich duped, in its maternal instincts especially, nor can one seriously believe that the Englishman was the happier for the fowl's misplaced affection. If the young physician is right, we may, perhaps, expect to see depilatories as popularly recommended as the contrary kind of nostrum. But, while a dozen advertisers offer to make the fat thin, nobody has yet discovered a way of making the thin fat. Baldness, according to the doctor, is the result of fatty degeneration, and persons naturally lean cannot, by taking thought, degenerate in this desirable direction. Sitting up late in an atmosphere of gas may do a good deal, and the tall hat of modern life is also valuable to persons who covet an appearance of precocious wisdom. Every kind of dissipation is also recommended ; but this prescription has obvious disadvantages, and is even uncertain. It is not recorded that Mr. Bob Sawyer and Mr. Benjamin Allen rose in their profession by baldness ; yet no young men ever did more to deserve this gift. To be early gray seems rather the privilege of poets than of physicians, if we may judge by the cases of Shelley and Ronsard. There is reason to believe that Byron would have been bald had he lived a little longer, and it is a matter of curious speculation whether his success would not have waned with his curls and when his days were really in the yellow leaf. On the other hand, he was just the man to wear a wig. The poet, in the following stanza, celebrates a sage who, perhaps alone among mankind, agreed with the young doctor :

There was an old person of Bristol,
Who had a bald head and a pistol ;
He shot all the Aldermen
Because they were balder men—
And then blew out his brains with the pistol.

—*Saturday Review.*

A NEW DOCTRINE ABOUT DRUNKENNESS AND RESPONSIBILITY.

ANOTHER ancient dogma bids fair to become obsolete ; we mean the doctrine asserting the responsibility of the drunken person for the criminal acts done in the condition of drunkenness. It was at least as early as the time of Chief-Justice Coke that the legal dictum regarding the double guilt of the inebriate criminal was formulated, to the effect that inebriety always aggravates the offence, and that the penalty should be increased, rather than diminished. This view has generally been entirely acceptable to the legal mind, until a recent date, since its tendency was eminently conservative of social and proprietary rights, and, *pari passu*, entirely acceptable to the general public. But nowadays there is a growing criticism of that theory, and eminent jurists in England and elsewhere have decided that a man may be convicted of an offence committed in drink, and yet be absolved from responsibility ; in other words, the criticism has reference not so much to the expediency of the old doctrine—that remains the same, but the justice of the theory is challenged. For example, as reported in the *Lancet*, Baron Pollock has held that the plea of irresponsibility was tenable in a case where a homicide was committed by a person after taking a small quantity of alcoholic liquor—a quantity not sufficient ordinarily to disturb the reasoning faculties, but which, in the case in question, was sufficient to set in motion an insane predisposition that became the prime agent in the manslaughter. Another eminent judge in England has recently ruled, in regard to the case of a drunken mother, who through the neglect of her babe occasioned its death by starvation, that the withholding of nourishment by the mother was not a crime, for the reason that it was undesigned, and that it is not a declared crime to imbibe too much liquor.

Chief-Baron Palles has ruled that neither law nor commonsense can hold a man responsible for the acts done under the influence of an intoxicant, if by reason of long vigil, deprivation of sleep, or impoverishment of the blood he shall have become so reduced as to be made drunken with a smaller quantity of liquor than would have produced that effect upon

him in good health. Justice Day has gone still further and has declared that a person who does not know the nature and quality of the acts he commits is not responsible for them, whatever may be the cause of his unconsciousness.

The thought contained in these decisions is a complete reversal of the ground of decisions that have been respected for three hundred years by the general public, that have been on a thousand grave occasions accepted by the criminals themselves without a whisper of dissent, and that have passed almost unquestioned by jurists until within the present decade. A recent judicial charge may be quoted to show the tenor that has prevailed in regard to the plea of irresponsibility: "No insanity or irresponsibility can be predicated in any given case unless the mind showed a continuance of delirium or delusion, and that in no case should this be taken into account, in mitigation of guilt, if it resulted from alcoholic intoxication." The ground of precedent, as ordinarily assumed by the State's attorney, whose business it is to bring to punishment as many criminals as possible, is commonly based on old English decisions that intoxication is never an excuse for crime, and that "no man can plead that he should be exempt from the law by reason of not knowing or not being able to control the extent and force of his acts, by reason of being drunk, and that drunkenness is a voluntary insanity, and those who use alcohol to that degree know full well the consequences of that act." These are the extremes of the question as to how far inebriety may coexist with irresponsibility. It is only of late years that there has been enough of practical psychology known by physicians to enable them to grapple with this problem, and still fewer have had that assurance of their convictions to support them against an intrenched and popular doctrine that has ruled the courts for three centuries. The Congress of Psychology, held at Paris during August, 1889, as reported in the *Press and Circular*, considered this subject and took formal action thereon, according to which it is proposed that the Government should be called upon to take steps to more thoroughly protect society against criminal dipsomaniacs, and for that purpose to establish special asylums for the treatment of habitual drunkenness. This proposition was adopted by the assembly unanimously.—*Journal of the American Medical Association.*

VITAL AND MEDICAL STATISTICS.*

By JOHN S. BILLINGS, M.D., U. S. Army.

THOSE of you who are familiar with the history of medicine in the early part of this century will remember the great anticipations which were formed and expressed by prominent physicians as to the results which might be expected from what was called the system of statistical medicine introduced in the Paris school by Louis and his contemporaries. This was not exactly a new system, but rather an attempt to methodize an old one—*i.e.*, to present the experience of different physicians in such a way that comparisons might be accurately made and the results mathematically expressed.

In this so-called numerical method all the details of each case observed are to be noted, as far as possible, without any special regard to whether these details may appear to the observer to have any special connection with the course of the case or its termination, or not. When a number of such cases have been collected, they are to be compared in all their details, showing in round numbers how many present such and such particular circumstances, and how many do not.

In order to make a useful application of this method, it is, of course, necessary that the different observers shall be describing substantially the same thing; that is to say, the disease to be observed must present a definite series of symptoms, so that a person properly qualified will recognize its existence without any liability to error. It should also be a disease which follows a tolerably regular and definite course, having a commencement which can be recognized. Such forms of disease include the so-called specific diseases and acute affections of particular organs. The method is most applicable to surgical cases of all kinds, including those which come under the domain of the various specialties.

As regards details of pathological anatomy, it has been

* Abstract of the Cartwright Lectures, delivered before the Alumni Association of the College of Physicians of New York, November, 1889. Lecture III.

pointed out by Dr. Flint that the statistical method can only apply to those changes which can be appreciated by the senses after death, and that, there being but one constant lesion found in typhoid-fever, viz., the softening of Peyer's patches in the small intestine, the statistical method gives us little assistance in the investigation of the pathological condition of this disease.

We may note, however, that if it be admitted that typhoid-fever is due to a specific bacillus, as seems now to have been fairly demonstrated, and that this bacillus has been discovered and verified mainly by the application of experimental methods, it is nevertheless true that the results thus obtained have met with a general and prompt acceptance, mainly because the application of statistical methods to the circumstances of outbreaks of this disease in different communities is in perfect accord with the bacillus theory of its causation.

This merely illustrates the general law that the experimental and the statistical methods must be used together, and that their results must be in accord to produce full confidence in the results obtained by either alone.

The sanguine advocates of the numerical system of Louis supposed that all that was necessary to discover all the laws with regard to the propagation of any disease, and the true value of any or of all methods of treatment proposed for that disease, was simply the collection by different observers of all the data which could be obtained from individual cases, and the tabulation of these, according to a certain fixed and almost mechanical system of permutations and combinations, by means of which the various symptoms are brought together in groups, in connection with the results observed, and that thus would be obtained a true scientific basis, or, as they commonly phrased it, "the science of medicine."

We can now see plainly enough that this is, from the nature of the case, impossible; that the data obtained by different men can hardly ever be made fully comparable; and that, however complete they may be, the number of factors which combine to produce such a result as the production of a particular form of disease in a healthy organism is so great that, from mere statistics of observation, we can never obtain any scientific knowledge as to the relative part which each factor has

taken in producing the result. This can only be done by experimental methods, in which the influence of one particular factor can be applied and those of others eliminated as far as possible; and the great advances which have been made toward obtaining a scientific basis for practical medicine within the last twenty-five years are, in the main, due to the experimental method. So soon, however, as we have, by the investigation of particular cases and by experiments, obtained a more or less probable theory as to the cause and mode of diffusion of a particular form of disease, the outbreaks of that disease in a community afford an invaluable means, in many cases, of testing the truth or falsity of the theory.

It must be admitted that the probabilities of error are much greater in medical than in vital statistics, and this for a number of reasons. The first is, that no two observers examine or interpret a disease in precisely the same way, and hence it is extremely difficult to collect a mass of observations sufficiently large to form a basis for statistical reasoning. Those who wish to be scientifically accurate in the use of such material, are usually compelled to deal with a very limited number of observations, because they cannot obtain a large number upon which they can fully rely.

The best data are, for the most part, those which lie in the field of surgical observation, since here the symptoms observed, the methods of relief applied, and the results obtained, are tolerably definite, and there is not likely to be much difference in the methods of recording them.

The methods of medical statistics differ fundamentally from those used by the vital statistician in that they usually have no relation to the phenomena observed in the normal, healthy, living population. The physician inquires, out of a thousand cases of children or of old persons that have been treated, how many times this particuar disease has been met with; or, in a given number of cases of this disease, what proportion have died. This method is, in fact, practically the only one which is available to the physician; but the vital statistician, if dealing with disease, will want to know the probabilities that a male between twenty and thirty years of age will contract a given disease, such as phthisis or typhoid-fever; and for this purpose he wishes to know the whole number of cases observed

in a given population, and the number of the population furnishing those cases, in order to establish the ratio.

Bertillon illustrates this in his comment that the small number of deaths of old men attributed to typhoid-fever might lead the physician, from his point of view, to say that typhoid-fever in old age is a rare disease ; but the vital statistician might conclude that the rarity of the disease in old age was simply due to the small number of those living at that period.

In discussing the tabulation of the returns of cases of acute rheumatism, in the *Collective Investigation Record*, Dr. Whipham gives the number of cases in each occupation out of 655 cases recorded. Of these, 71 were domestic servants, 16 agricultural laborers, 13 farmers, 10 grocers, etc. He comments that the number of domestic servants (71) is a remarkable occurrence, and proceeds to account for it by the consumption of alcoholic drinks, etc.

It is evident, however, that absolutely no conclusions can be drawn from these figures, since there is no definite proportion between the number of domestic servants attended by the physicians who made the reports and the number of domestic servants in existence, nor is there any relation between any of these figures and the number of domestic servants attacked by rheumatism. The only way in which this factor could be brought in in such statistics would be with reference to frequency and character of complication, or to relative fatality of the attacks in comparison with other occupations.

The fact that in each case of sickness there are many different circumstances which combine to produce the result is not, as Louis remarks, a valid objection to the use of statistical methods for the purpose of estimating the influence and relative importance of each of these influences ; it is rather an argument in favor of their employment. Counting is better than guessing, and when it gives contradictory results as applied to two groups of cases, it indicates that some circumstances have not been taken into sufficient account, and that further inquiry is necessary. In the body of the sick man, as in the test tube, like causes under like circumstances will produce like effects.

Admitting that the chances of error in medical statistics are very much greater than in those relating to vital statistics, it does not follow that they have no value. It simply increases

the desirability of collecting a large number of facts before proceeding to draw any definite deductions.

In statistics in regard to therapeutics we have to take account of the various influences which the condition of the organism exerts upon the results, before we can fairly estimate the action of the new and special influence which has been introducted in the shape of an action of a drug or a particular mode of treatment. In any event, such statistics, even when derived from a small number of cases, serve to indicate lines of investigation, and to ask questions, if they do not answer them.

The greater part of our pathology and therapeutics has not been derived from statistical observation. Whenever a necessary and logical connection between a particular cause and the resulting ph nomena has been established, statistics are of little or no value in demonstrating the connection. In every case the result must follow the cause, as it does in a chemical experiment, and a few repetitions of such experiments give as great a degree of certainty as a thousand or more.

The chances of the occurrence of a certain event in relation to cause can only be mathematically calculated when the totality of the possible causes of the result remains the same under the different circumstances investigated. This is one of the chief reasons for the impossibility of drawing positive conclusions from medical statistics, properly so called.

The consequent condition is one that I have already mentioned—viz., the application of the law to large numbers and the consideration of the limits of positive error.

The services rendered by statistics to medical science are by no means so great as was hoped by those who first proposed the application of this method ; partly from the nature of the case, partly from the wrong application of statistical methods to groups of cases to which they are in nowise applicable. What result, in fact, can we expect from statistics applied, for example, to a number of cases of fever before the distinction between typhus, enteric, and relapsing fevers was understood.

" The results of medical statistics will not apply to the treatment of any particular case. They can never prove that bloodletting should be employed in all cases of pneumonia, or that it should never be applied in any case of pneumonia. Even the results obtained from the most satisfactory medical statistics

will only be found useful to the physician in directing his treatment, in the absence of any special indication in the particular case which he has before him."

The data upon which to base medical statistics must be obtained either from published records, from unpublished memoranda collected by means of correspondence or by the so-called collective investigation methods, or from personal experience. The published data include such records of private practice as are given in journals, transactions, monographs, etc., records and statistics of hospitals, statistics of public medical services, and of medical and life insurance societies.

In many respects the crude data, in the form of records of individual cases, are the most reliable, but the labor of collecting and combining them is great, and we desire, therefore, to use the statistical tables prepared by previous workers, as far as they are available, for the particular inquiries which we have on hand.

Detailed reports of cases, such as are suitable for use in statistical work, are not over-plentiful. In the majority of cases the individual data are not given. We have only summary statements of tables of results. This is the case with regard to much the larger part of the great mass of reports of results of hospital and asylum practice, either in the form of separate annual reports or in summaries for journals or societies. These reports give some information as to the prevalence of certain diseases in certain places at certain periods of time, and in this way have some historical value ; but they do not show the proportion of cases of disease or death to the living population in which these occur, and very few of them give the data by sex and age in the manner required by the statistician. Some of these calculate death-rates with reference to the total number admitted during the year ; others, to the total number treated, which includes those remaining on hand at the beginning and those admitted during the year ; and others, to the total number disposed of during the year by discharge, transfer, or death. A few of them give the average daily number under treatment during the year, and the average number of days' treatment for each case, sometimes making a distinction of sex, but almost never of race or age.

Comparison of gross death-rates of different hospitals, how-

ever calculated, are of little value for the purpose of determining either the sanitary condition of the place, the skill of the medical staff, or the merits of the particular system of treatment, owing to the great variations in the class of patients admitted. Of course, the statistics of hospitals for special classes of diseases can only be compared with those of the same kind; and even for general hospitals, the fact that the gross death-rate of one is higher than that of another, proves very little.

In a paper by Dr. Guy on the rate of mortality prevailing in the general hospitals of London, he compares the death-rates of King's College Hospital, with which he was connected, for the first five years of its existence—1840 to 1844—with the five years from 1857 to 1861. During the first period it was an old building, in a bad locality, and greatly crowded, and without any reputation as a hospital or as a medical school. During the last five years it was in a new building with excellent sanitary arrangements, and with an excellent reputation. He calculated the death-rates on the number of admissions to the hospital. The rate for the first five years was 8.4 per cent; during the last five years it was 10.85 per cent. He concludes that a higher rate of mortality may be due to causes very different to sanitary defects in the building and want of skill in the medical staff; and that in a large city, in the case of a hospital enjoying similar sanitary advantages, the rate of mortality is mainly determined by the reputation of its hospital staff among the public at large and among its own pupils, which reputation influences the proportion of grave and dangerous cases which are sent to it.

In comparing hospital death-rates, it is now generally agreed that it is best to make use of the death-rates in relation to the total number of persons disposed of by discharge, transfer, and death for a series of years. Comparison of the number of deaths with the admissions only is apt to give very misleading results. A better method than this is that of Bertillon, who adds to the number at the beginning of the year one half of the sum of those admitted and of those going out. It is also desirable to know the ratio of deaths and discharges to the mean population of the hospital, which is obtained by dividing the number of days of treatment by 365; but in this connection it is to be remembered that when the mortality is calculated with

relation to the number of days' sojourn in the hospital, those physicians who keep their patients the longest will show the lowest death-rates.

In his prize essay on *Hospital Statistics*, Dr. Steele substantially agrees with the remarks of Dr. Guy above referred to, and says that the hospital which confers the greatest benefit upon the community is that having the highest death-rate, as it is the one which admits the most critical and incurable affections. As the population of a city increases, the demand for hospital accommodation also increases, and unless more of this is provided, the tendency is to select the more serious cases for admission, and thus to procure an increased mortality rate.

I cannot assent to the proposition that a high mortality is any proof of the utility of a hospital, or of the skill of its staff ; but it is certainly not a proof of the contrary.

" In all large hospitals from one half to three fourths of the deaths in the surgical department are due to accidents. The ordinary death-rate of surgical cases ranges from 5 to 7 per cent. If the deaths from accidents be deducted from the total deaths in surgical cases, there will be but a small percentage left. The mortality of the non-accident cases averages from 4 to 5 per cent. But the fame of the hospital, the reputation of its staff, especially for difficult and hazardous operations, may tend to increase the ordinary death-rate."

An increased mortality in the surgical ward may be due to special provision for permanent residence of patients with incurable diseases, such as the establishment of a ward for cancer cases.

There have been a number of reports and discussions in statistical congresses and societies with regard to the best forms to be used in publishing hospital statistics. The following are the *desiderata* for hospital statistics as given by Miss Nightingale :

1. Remaining in hospital on the first day of the year.
2. Admitted during the year.
3. Recovered or relieved during the year.
4. Discharged incurable, unrelieved, for irregularities, or at their own request.
5. Died during the year.
6. Remaining in hospital on the last day of the year.

7. Mean duration of cases in days and fractions of a day.

In each of these headings the data are given for each disease, for each sex, and for each of a number of groups of ages ; the primary object being to ascertain the total sick population—that is, the number of beds constantly occupied during the year for each disease and each age and sex ; 2d, the number of cases of each disease for each age and sex submitted to treatment ; 3d, the average duration of each disease for each age and sex ; 4th, the mortality of each disease for each age and sex ; and, 5th, the proportion of recoveries for the same.*

Prior to the discovery and employment of antiseptic methods in obstetrics the records of lying-in hospitals were very unsatisfactory. It is true that we have no very definite standard of death-rates in childbearing in private practice with which to compare them, but this rate is given by the Registrar-General of England as being at the rate of five per thousand children born alive for the 28 years, 1847 to 1874.

The summary of the returns of the extern maternities in connection with Guy's, Bartholomew's, and St. Thomas's Hospitals for the 21 years, 1856 to 1876, comprising an aggregate of 74,580 cases, gives a mortality of 4.1 per 1000.

The largest lying-in hospital and the oldest is that known as the Rotunda, or Dublin Lying-in Hospital. In 198,481 cases of confinement in that hospital, the death-rate was 13.2 per 1000.†

It is not an easy matter to determine what may be called the normal or average mortality of women in childbirth in order to determine the probable utility of a particular mode of managing cases of labor, as, for example, the so-called aseptic method. From the mortality statistics of the late U. S. Census (Report on Mortality and Vital Statistics, Pt. II., lxx.) we find that in 1,577,173 births 5646 deaths of the women are reported, being in the proportion of 3.57 per thousand births. This proportion was higher in the rural districts than in the large cities, and in negroes than in whites.

* See paper on "Hospital Statistics and Hospital Plans," by Florence Nightingale ; "Transactions of the National Association for the Promotion of Social Science," 1861, p. 554.

† Summarized from *Dublin Medical Journal*, 1869, and from Dr. Johnston's Annual Reports from 1868 to 1875.

For the same year (1880) the Registrar-General of England reports the death-rate of women in relation to births as 2.07 per thousand. If, now, we compare these figures with those given by obstetricians and physicians, we shall find that the latter give death-rates from two to four times as great. Thus, Duncan gives the death-rate in private practice as from 8 to 10 per 1000 births, while Le Fort gives the figures from maternity hospitals as 30,594 deaths in 888,312 births, or over 34 per 1000 ; while Ehlers, using the statistics of Prussia from 1816 to 1886, gives the rate as from 5.8 to 9.4 per 1000.

How are we to explain these differences ? Is the reported great mortality in rural districts, in certain races, or in physicians' reports due to peculiarity in the cases reported, or to the surroundings, or to the method of making reports and collecting data ? Evidently the latter is first to be considered. In the data furnished by the Census and the English registration reports, the cases attended only by midwives and "wise-women" are included as well as those attended by physicians, and it is among the negroes and the Germans that the proportion of cases thus attended is the greatest. Moreover, in the cities where there is a regular registration of deaths upon physicians' certificates there is less tendency to give the vague term of childbirth as the cause of death than in the rural districts where the cause of death is returned by non-professional persons ; but this does not apply to England, and it is not probable that it greatly influences the results in this country.

The deaths reported in the census as due to childbirth are those which occur during or soon after labor, including those due to hemorrhage, exhaustion, acute uræmia, etc., while those which occur at a later period may be reported as due to peritonitis, septicæmia, etc., although the physician in reporting the results of his private practice would include all these as deaths due to labor.

While the physician will usually consider only the relation between the number of cases of labor and the number of deaths in childbirth, the vital statistician will study the relations of deaths in childbirth to the number of women living between the ages of 15 and 50 years, or to the total number of deaths from all causes. The figures of the last U. S. Census show that of every 100,000 women between the ages of 15 and 50

living in our large cities 16.21 died in childbirth during the year, while in the rural districts the corresponding figure is 51.56.

If, then, we are to judge as to whether the death-rate in childbed in the practice of a particular physician is to be considered as high or low, we must first know whether the figures relate to hospital or to private practice, and, if the latter, whether it was in the city or in the rural districts. To obtain some standards for comparison, we may use the numerous reports found in medical literature, in which physicians have given the statistics of their private obstetrical practice, and compare the results with those given in the statistics of maternity hospitals.

For prisons and asylums the death-rates should be given for the average daily population in the institution, and not for the number of admissions or for the number of cases disposed of; but in these cases gross death-rates for the whole population are of very little use. It is necessary to have them with distinction of sex and age, in order to make comparisons with the death-rates of the general population coming under the same groups.

Suppose that, for the sake of testing the relative efficiency of two different modes of treatment, or of the general progress made during a series of years in therapeutics, we take the statistics of a particular disease—which should be one having a tolerably definite train of symptoms, so as to be easily recognized. A disease which is common to select for this purpose is acute lobar pneumonia. Suppose, now, that in a given group of cases of pneumonia, subjected to one method of treatment, the mortality or the proportion of deaths is found to be greater in another series of cases subjected to a different treatment, are we thereby authorized to conclude that that mode of treatment connected with the lowest mortality is really the cause of the low mortality? By no means. Before we can do this, we have to settle the character of the cases, the proportion of those in each group occurring in advanced age or in intemperate persons, or in those affected with other diseases, or in certain races, because all these circumstances influence the death-rate. We have also to take into account the total number of cases in each group, in order to make an allowance for the probable error due to small numbers. If the two groups of cases have occurred in different localities, or have

been treated in different institutions, we have then to take into account the special influences of the locality or institution, as far as it is possible to do so, and not until all these corrections have been made can we fairly estimate the relative influence of the treatment.

I have collected the statistics of 209,755 cases of pneumonia occurring in this country and in Europe within the last fifty years, as shown by the following table, giving an average death-rate of 21.11 per cent. The distinction of sex is given in 33,904 of these cases, showing a death-rate of 19.86 per cent in males and 24.68 per cent in females :

Pneumonia.	Cases.	Deaths.	Percentage of Mortality.
Civil hospitals, German and Austrian	44,952	9,868	21.95
Civil hospitals, British	3,467	770	22.20
" " Canada	353	91	25.77
" " American	6,259	1,918	30.64
" " India	133	41	30.82
Total	55,164	12,688	23.00
Military hospitals, Austrian, 1873–82	9,007	1,276	14.16
Military hospitals, U. S. Army, 1377–88	2,430	455	18.72
Military hospitals, Br. Army (Crimea, 1854–57)	590	125	21.18
Military hospitals, U. S. Army (1861–66), White troops	61,204	14,738	24.08
Military hospitals, U. S. Army (1861–66), Colored troops	16,133	5,233	32.43
Total, military hospitals	89,364	21,827	24.42
U. S. Navy, 1873–88	933	92	9.86
Br. Navy, 1872–76	1,670	194	11.49
U. S. Marine-Hospital Service, 1872–88	3,454	573	16.58
Total, Naval and Marine Service	6,057	859	14.18

Pneumonia.	Cases.	Deaths.	Percentage of Mortality.
Norway, 1880–85 (statistics for kingdom).....	59,170	8,907	15.05
Grand total.....	209,755	44,281	21.11
Pneumonia Cases with Distinction of Sex.			
Civil hospitals, males.....	22,862	4,539	19.86
" " females.....	11,042	2,726	24.68
	33,904		

The distinction of deaths by ages for each sex is given in 24,557 cases, and from these data I have calculated the proportion of deaths to cases in each age-group, the result showing the immense importance of age as a factor in the death-rate from this disease.

In the absence of statistics of cases and deaths by ages, we can get very little information from statements of death-rates from pneumonia. For example, the death-rate in U. S. hospitals from pneumonia from 1877 to 1888 was 18.72 per cent of the cases treated. Was this a high or a low death-rate? We can only say that it was probably rather below the average, since the average death-rate for males between 20 and 50 years of age is 19.9 per cent of cases treated. The importance of such considerations is well illustrated in a paper by Dr. C. W. Townsend and A. Coolidge, contained in *The Medical News*, July 27th, 1889, p. 85.

This paper is a discussion of all the cases of acute lobar pneumonia treated at the Massachusetts General Hospital from 1822 to the present time, the figures being divided into periods of ten years, making seven decades in all.

The result would indicate a steady rise in fatality from 1822 to the present time. What are the circumstances which make the cases of pneumonia coming into the hospital during the last few decades more fatal than those which occurred during the first three or four decades? One of the first things investigated was the average ages of the cases of pneumonia admitted in each decade, and the results obtained showed that there was

a greater number of patients over fifty years of age in the latter decades, and that the average age is steadily increasing. In like manner, the proportion of cases occurring in persons of intemperate habits, or complicated with other diseases, was examined for each decade. The influence of race was also estimated, with the result that in Americans 9 per cent, in Irish 11 per cent, and in other foreigners 14 per cent were fatal; that was omitting all fatal cases over fifty years of age who were intemperate or complicated.

Now, if we take the mortality and make the necessary corrections for the influence of age, or proportion of intemperate and complicated cases, and set apart the influence of the causes of death which are entirely independent of treatment, we find that there is but little variation of mortality from decade to decade, and if the influence of race were brought in, we could not infer that, upon the whole, there had been any material change in the mortality of pneumonia for the last sixty-eight years, although there have been very great variations in the treatment during that time.

The conclusions arrived at by the authors are as follows:

1. In the 1000 cases of acute lobar pneumonia treated at the Massachusetts General Hospital, from 1822 to 1889, there was a mortality of 25 per cent.

2. The mortality has gradually increased from 10 per cent in the first decade to 28 per cent in the present decade.

3. This increase is deceptive for the following reasons, all of which were shown to be a cause of a large mortality:

(*a*) The average age of the patients has been increasing from the first to the last decade.

(*b*) The relative number of complicated and delicate cases has increased.

(*c*) The relative number of intemperate cases has increased.

(*d*) The relative number of foreigners has increased.

4. These causes are sufficient to explain the entire rise in the mortality.

5. Treatment, which was heroic before 1850, transitional between 1850 and 1860, and expectant and sustaining since 1860, has not, therefore, influenced the mortality rate.

6. Treatment has not influenced the duration of the disease or of its convalescence.

Suppose we try to estimate the relative value of a particular treatment of rheumatism, say by salicylates. We find several tables in medical literature giving the results of treatment by this and other methods. As a type, take the analysis of 1200 cases treated at Guy's Hospital, given by Hood (*British Medical Journal*, December 31st, 1881, p. 1119), in which he gives the average duration of illness, number of relapses, and number of cases of cardiac complications, in 350 cases treated with salicylates, and in 350 cases treated without them, and concludes that relapses and cardiac complications were more frequent under the salicylate treatment, but that the pain ceased sooner and the average length of stay in hospital was less. But the cases are not tabulated by sex, age, race, etc., so that we can estimate the bearings of these circumstances on the results; nor in any tables are these results thus classified.

In the fourth volume of the *Collective Investigation Record* of the British Medical Association there is a table of 655 cases of acute rheumatism, in which the details of each case are given under twenty-seven heads. Dr. Whipham analyzes these, showing how many cases there were in each sex, how many there were in each group of ages, how many in each occupation, etc., but he does not systematically attempt to group these circumstances except as regards teetotalers, temperate and intemperate persons; in other words, he does not tabulate them as a vital statistician would do, so as to show how many of each sex in the first attack in each age-group recovered, died, had sequelæ, etc., when treated by salicylates, and how many when not treated. In attempting to treat the data by formal statistical methods, it will soon be seen that they are totally insufficient in number to give definite results. For example, in temperate males, having their first attack, and treated with salicylic acid, of 25, between five and fifteen years of age, 1 died; of 77, between fifteen and twenty-five, 1 died; of 35, between twenty-five and thirty-five, none died; and of 17, between thirty-five and forty-five, 2 died. Of the intemperate males under the same conditions—16 in all—none died. Are we to conclude that intemperate males with acute rheumatism should be treated with salicylic acid? Not at all—it would require something like 60,000 cases instead of 600 to demonstrate anything of this kind.

Evidently the statistical data which are of the most importance differ for different diseases. If, for example, we are comparing the mortality from pneumonia under different systems of treatment, it is clear that we must have the data with subdivisions by age, and the same would hold good for Bright's disease, and, in fact, for almost all diseases, if the law of decline of vital energy with advancing years holds good. But, for cancer, the data of sex and race are quite as important as those for age.

An important point in medical and vital statistics is to keep the current record, or what may be called the day-book account, entirely separate and distinct from the classification or modes of tabulation. The current record must be made complete at the time, for if any items are left out they can never be replaced. But this record once made may be used in various systems of classification and comparison for many years afterward. If an attempt be made to put this record into the form of a classified return primarily, it is certain to be defective, and will not be applicable to researches of another kind.

In the reviews of the progress of medicine, of which we already have a large supply in the shape of annual addresses and centennial literature, and to which extensive additions will, no doubt, be made at the close of the present century ten years hence, you will find more or less elaborate statements of the advances which have been made in diagnosis, pathology, preventive medicine, and surgical therapeutics in all its branches. Also, it is easy to show that we have made great advances in the art of relieving pain. But when we seek by statistical methods to determine what advances we have made in the prevention of death by the internal use of drugs, it must be confessed that the data are, for the most part, wanting, and that the optimist and the pessimist can compound theories and beliefs upon nearly an equal footing—that is, that of ignorance of the real facts in the case.

It is easy to see that the statistics of fevers collected in the last century, before typhus, enteric, and relapsing fevers were distinguished from each other, are of little use now, and modern bacteriology has destroyed, to a great extent, the value of the old statistics of tubercular diseases, typhoid-fever, cholera, etc., and of the statistics of surgical operations. They have rendered some service in their day, but their value is now

chiefly historical. There are, however, in medical literature, a very considerable number of cases which have been recorded with sufficient detail to be available for statistical treatment which they have not yet received. Death-rates in relation to the number of cases of special forms of disease showing the relations of mortality to sex, age, and race are yet to be calculated, and there is material for some good and useful work in this direction.

Within the last twenty-five or fifty years in civilized communities the gross mortality has diminished—there has been a prolongation in the average expectation of life : but how much of this is due to preventive medicine, how much to improved conditions of habitation and to the lowering of the price of food, and how much to improved methods of treatment? Dr. Sweifel endeavored to answer this question in a lecture on the influence of medical knowledge on the life of the people, delivered in Leipzig in 1887 ("Der Einfluss der ärtzlichen Thätigkeit auf die Bevölkerungsbewegung").

Taking as a basis for his calculations the figures of Bavaria for ten years, and those of Saxony for thirteen years, he found that for 100,000 of living population the average number of deaths from tuberculosis increased from 250 to 258, from inflammation of the lungs from 222 to 270, from croup and diphtheria from 98 to 123. He remarks that these are saddening figures ; in spite of the sanitarians and health resorts, in spite of ventilation, new methods of treatment by inhalation, compressed air, etc., the number of men who die from diseases of the respiratory organs is steadily increasing, and he queries whether Süssmilch was not right in his phrase "Göttlichen Absterbeordnung"—divine law of death.

On the other hand, he shows that the mortality from typhus has fallen from 62 to 34. But the question is, whether this is due to diminished prevalence of the disease, or to a diminished mortality in the same number of cases of the disease due to the improved medical treatment. It may be noted in this connection that the chief effect of improved sanitation appears in the lessened mortality in children under five years of age, and that it is chiefly in the mortality occurring after these ages that we are to look for the influence of improved medical treatment. In examining this, however, it is to be remembered that improved sanitary conditions affecting chiefly infants, by

preserving a number of feeble and sickly children tend to produce a higher rate of mortality in succeeding years. In cases admitting of surgical treatment, and in childbirth, there can be no doubt as to the diminished mortality in the practice of those who use the best accepted modern methods; but these methods are not yet used scientifically by half of the profession, and the results are not perceptible in the general death-rates thus far collected.

It must be admitted that the greater part of the increased expectation of life is probably due to better food, purer water, greater cleanliness, and improved methods of preventing the spread of contagious diseases. If we look at the curves representing the loss of life in large masses of people at different times and places, we see that the laws of life and death have but a narrow range of variation after the age of infancy has passed, and that improvements in therapeutics have lifted the lines but very little. They have lessened suffering greatly, but they have not greatly deferred death.

In our present state of knowledge there are certain forms of disease and derangement of organs whose tendency is to recover without any treatment, or in spite of bad treatment. There are also certain diseases and derangements which are incapable of cure by any known method of treatment. Otherwise, man would not be mortal. Between these two classes is a small number of cases of disease, the result of which depends on the treatment. In order that medical statistics may give us any information in regard to this last class we must have some idea as to the proportion of each of the two other classes.

A very good illustration of some of the ways in which lies can be told with statistics may be found in the various books and papers which have been produced in connection with the anti-vaccination controversy.

In order to understand the relations between vaccination and small-pox, it is necessary to have the death-rates from small-pox given for different periods of life—that is, by age. In this country and in Great Britain we have no data as to the deaths by small-pox by different ages prior to the introduction of vaccination, because the registration of deaths by ages has only been carried on for a little over fifty years. We can, however, for Great Britain, compare the statistics of vaccination for three different periods—the first from 1847 to 1853,

in which gratuitous vaccination was provided for the people, but it was purely an optional matter with some whether they should make use of it or not; from 1854 to 1871 vaccination was obligatory by law, but this was mainly theoretical, since the law was practically not enforced; from 1872 to 1880, when the vaccination was rigidly enforced.

Before the introduction of vaccination there were but few persons who did not have the disease at some time in their lives. It appeared in epidemic waves over Europe, usually at intervals of from five to seven years, being about the time required to accumulate, by births, a sufficient amount of susceptible persons to enable an epidemic to make headway. Of course, then, the great majority of persons had the disease in infancy, or in early childhood, and a large proportion of these died. So that in those days the small-pox mortality in the early years of life was high, while those who survived were either protected from future attacks or presented a certain amount of immunity to the poison of the disease, so that the small-pox death-rate of the higher ages was then low. When vaccination came to be general, the young were protected, but were not protected as permanently and completely as would have been effected by an attack of small-pox. The result of this was that the death-rate from small-pox under five years of age fell 80 per cent, while from five to ten years of age it fell 45 per cent, and in the older ages it may even have increased where revaccination was not systematically and thoroughly carried out. Taking the English records for 1872 to 1874 and 1877 to 1880, it is found that the proportion of deaths under and over fifteen years of age, per thousand deaths from small-pox, differs according to whether the persons were vaccinated or unvaccinated, as follows: Of 1000 unvaccinated persons dying from small-pox, 672 were under fifteen years of age and 328 over fifteen. Of 1000 vaccinated persons dying from small-pox, 334 were under fifteen and 666 over fifteen, the proportion being, as will be seen, almost precisely reversed under the two conditions.

Whether the data be taken from a State, a large city, or a small town, the results are the same. Take, for example, the records of the town of Kilmarnock, in Scotland. For thirty-six years, from 1728 to 1764, this place had an average population of 4200, and a very accurate register of the births and

deaths was kept. During these thirty-six years there were nine epidemics of small-pox, succeeding each other at regular intervals of about four years, just the time required to raise a fresh crop of unprotected victims sufficiently numerous to spread the contagion. Of every 1000 deaths during these thirty-six years, 161 were due to small-pox ; in the twenty-six years ending 1879, only 9.9 per 1000 were due to it, or one-sixteenth of the old proportion. In the old days one epidemic left very few unmarked victims for the next one. Those who recovered were pitted for life, and there were very few, except young children, who were unscarred.

By the modern English life-table, of every 1000 children born alive, 2.3 may be expected to die of small-pox before reaching five years of age. In the old of Kilmarnock the proportion was 116 to every 1000.

The statistical mill grinds what is put into it ; it enables you to compare the results of different aggregations of circumstances selected by yourself ; but it neither guides your selection nor enables you to reason properly on the results. If you compare the death-rate per 1000 of living population in an epidemic of small-pox occurring in a city in the United States in recent times with that of an epidemic occurring in a city in the last century, you will probably find that the death-rate was greater in the modern city than in the ancient one. Perhaps two thirds of the people in the modern city were properly vaccinated—in the ancient city none were vaccinated. Are we to conclude that partial vaccination increases the death-rate from small-pox? Yes, for a single epidemic year ; but if you take a period of twenty years or more for your comparison, you will find the death-rate much lower in the vaccination than in the ante-vaccination period. Why is this? Because in the ante-vaccination period the adults had been through several epidemics of small-pox and had either had the disease and survived, or had proved insusceptible to the virus —being, in either case, protected. The only class of the population in much danger from small-pox in those days were the young children born since the last epidemic, less than ten years ago. But in the modern community, partially protected by vaccination, there has accumulated a considerable number of unprotected adults during the long periods which now elapse without an outbreak, and these increase the fuel for

flame, and consequently the death-rate. Comparisons of small-pox statistics for single years are therefore almost worthless.

The results of vaccination may be indicated in another way. At the commencement of its organization in 1761, the Equitable Society for Insurance of Lives, the oldest and most important of life insurance companies, charged 12½ per cent extra for all persons who had not had the small-pox. In 1781 this was reduced to 11 per cent extra.

In 1802 it was resolved "that the directors be empowered to grant policies of assurance upon the same terms to persons who aver in their declaration that they have had the cow-pox, as to those who aver in their declaration that they have had the small-pox. But if such person shall die afterward of the *small-pox*, then such policy shall be void." In 1823 the words: "But if such person shall die afterward of the small-pox, then such policy shall be void" were stricken out.

In vital statistics, as in other branches of social science, it is not true that the effects of causes acting in combination are equal to the sum of the effects of each of the causes acting separately. Different causes of death having no relation to each other do not have a joint effect which is equal to the sum of the effects of each cause taken separately, and it is, therefore, difficult to bring the phenomena of vital statistics within the boundaries of mathematical formulæ. In the doctrine of this kind of averages time and number are not convertible terms.

Statistics apply to masses of men, to communities, not individuals. We find a mass of matter moving in a certain direction with a certain velocity and endeavor to calculate the direction and amount of the forces which have produced this result. In like manner we may consider the tendency to death in a community as a resultant of several forces and endeavor to estimate the influence of each of these forces in producing the result.

In studying medical and vital statistics one is somewhat in the position of a man on the deck of a large Atlantic steamer, out of sight of land and gazing on the troubled ocean. He sees many waves, large and small, apparently moving in very different directions, and it is not until he has, by careful examination and repeated comparison, learned to distinguish the ripples due to the wind now blowing, the larger cross seas resulting from forces which were acting a few hours before, and

the long rolling swells which indicate to some extent the direction and force of the tempest of yesterday, that he can begin to understand the roll of the ship on which he stands; while to appreciate the force and direction of the great current which is sweeping with it all the troubled water and the ship itself, requires skilled observation with special instruments, and the use of charts which embody the experience of hundreds of voyages. So, also, in viewing the records of human life, diseases and death, the variations which are at first most perceptible are often those which are most superficial and which give little or no indication of the magnitude and direction of the movement of the great masses beneath.

The most valuable sources for data relating to vital statistics, and, in many respects, to medical statistics also, are those contained in the Reports of the Registrar-General of England for the last forty years, and especially in the supplements which have been issued every ten years during that period. Next to these, for matters relating to this country, come the statistics of the State of Massachusetts for the last forty years, the statistics of New Jersey for the last ten years, the Mortality and Vital Statistics of the Tenth Census, and the statistics of Boston, Philadelphia, New York City, and of the District of Columbia. Especially valuable, also, are the vital statistics of Sweden, of Belgium, of Italy as published for the last six or seven years, of Norway, of Switzerland, of Prussia, and of many of the large cities of Western Europe.

AN EPIDEMIC OF PULMONARY PHTHISIS.

UNDER the above title Dr. Marfan,* chief of the medical clinic of the Faculty of Medicine of Paris, gives the details of a localized epidemic which is at least very significant, and is also a timely contribution to the literature of tubercular infection. In an important business house in the centre of Paris, twenty-two persons were employed about eight hours a day. One of them, aged forty, employed at this place for twenty-four years, had been phthisical for three years, when he died on January 6th, 1878. He coughed and spat upon the floor

* *La Semaine Médicale*, October 23d, 1889, p. 399.

for three years, and did not leave his work till three months before his death. From that time, out of twenty-two persons employed, fifteen have died. One only died of cancer, the remaining fourteen died of pulmonary tuberculosis. One year before the death of the first person, who appears to have been the starting-point of the epidemic, two employés, who had been connected with the same business for more than ten years, began to cough and spit upon the floor. They died in 1885. Beginning with the end of 1884, the deaths followed each other at closer intervals.

Dr. Marfan states the unsanitary conditions of the apartment in which these persons were employed. It was small, and the cubic air-space was less than ten cubic metres (350 feet) to each person. It was badly ventilated, badly lighted, and the gas was burned a part of each day, especially in winter. The floor was of wood, uneven, cracked, and very dirty. The first victim of phthisis and those who followed spat directly on the ground, and the sputa becoming dry, was converted in this already unhealthful apartment into a poisonous dust. The room was swept each morning, and sometimes the employés arrived before the sweeping was finished and while the dust was still floating in the air. It was difficult to sweep the room thoroughly, since the tables were fixed to the floor. It appears very probable that the swallowing and inhaling of this tuberculous dust was an essential factor in the propagation of the disease.

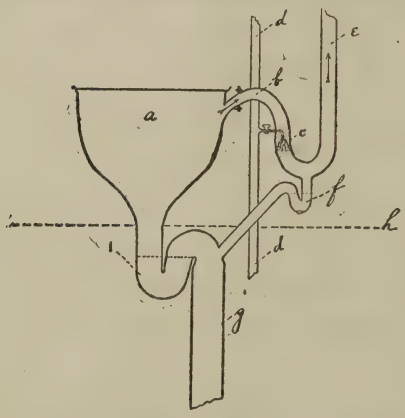
The proprietors of the place where the deaths occurred removed and burned the floor, and so rapidly was the work accomplished that the reporter had no time to collect a sample of the dust from the cracks in the floor for the purpose of experiments upon animals. A new floor was laid, which was waxed and treated from time to time with spirits of turpentine, all painted surfaces were repainted, and Dr. Marfan recommended that the floor should be swept in the evening after the departure of the employés, and that the windows should be left open all night.

Dr. Vallin recommends in place of these measures a mixture of equal parts of coal-tar and spirits of turpentine, or of paraffine dissolved in warm petroleum, and in place of the sweeping, the removal of the dust by sponges, or cloths moistened with an antiseptic solution.—*Boston Medical and Surgical Journal.*

AN APPLICATION OF THE WATER SPRAY TO THE VENTILATION OF WATER-CLOSETS.

By SAMUEL G. DIXON, M.D., Professor of Hygiene, University of Pennsylvania.

THE apparatus here described is adapted to maintain a constant ventilation of the bowl of a water-closet.



Reference to the drawing shows a water-closet bowl A. This discharges through the trap I into the soil-pipe G, having passed through the floor-line H. D represents the water-pipe supplying the flush tank of the water-closet. B and E represent a U-shaped pipe leading from the bowl of the closet to the outer air. C pictures a cone-shaped spray of water formed by reversed spiral grooves in the tap, the supply of water for this jet being taken from the pipe D. F shows waste-pipe and trap leading into the soil-pipe G.

The spray C forces the air ahead of it through the pipe E and draws air from the bowl A through the pipe B, thereby producing a constant current of air from the bowl of the closet to the outside atmosphere.

FREE LOVE, as between you and your neighbor's wife, may be very agreeable to you; but, as between your neighbor and your wife, is sure to be disagreeable to you. So, a cesspool on the back end of your lot, under your neighbor's dining-room window, may be convenient for you; but a cesspool on your neighbor's lot, under your dining-room window, is not entirely satisfactory to you. —*Wight.*

THE MEDALS, JETONS, AND TOKENS ILLUSTRATIVE OF SANITATION.

By Dr. Horatio R. Storer, Newport, R. I., Member of American Public Health Association, etc.

(Continued from page 155.)

[I have another Plague piece to report, which was unknown to P. and R.

Marseilles (1784).

743ª. Obverse. Bust of the King. Inscription: Louis XVI, Roi Et Frère Bienfaisant. Dupré.

Reverse as that of No. 743.

Cat. des poinçons, etc., p. 294, No. 42ª.

Under Small-Pox there might have been mentioned

Dr. Thomas Sydenham, of London. "On Confluent Small-Pox," 1682. Already described.

Dr. Sir James Y. Simpson, of Edinburgh. "Intra-uterine Small-Pox." *Edinburgh Journal of Medical Science*, April, 1849, p. 694; "Obstetric Memoirs and Contributions," Edinburgh edition, ii., p. 390; Philadelphia edition, ii., p. 359. "Simultaneous Co-existence and Progress of Small-Pox and Cow-Pox; their mutual influence on each other." *Edinburgh Journal of Medical Science*, September, 1854, p. 276; "Obstetric Memoirs and Contributions," Edinburgh edition, ii., p. 476; Philadelphia edition, ii., p. 433. Already described.

Dr. Friedrich Anton Mesmer (1723 [Duisburg; 1733, Kluyskens, Thomas, Biographical Dictionary;] n—1815), of Meersburg in Swabia. "Lettres sur l'Origine de la petite Verole," etc. Paris (1802), 8°.

893ª. Obverse. Bust to right. Beneath, Borrel 1856. Inscription: Fred. Ant. Mesmer.

Reverse. Société du Mesmérisme de Paris.

Duisburg gives 1836.

Bronze, and gilt. 18. 28 mm.

Kluyskens, ii., p. 212 ; Duisburg, p. 144, CCCLXXXVIII. In the Fisher Collection.

893[b]. Obverse. Bust to left. Beneath, Lassaque. Inscription : Fred. Ant. Mesmer.

Reverse. Within field : Le jury magnétique | d'encouragement | et de reconnaissance | (institué a Paris le 25 Mai 1847) | A. Mr. (here name of recipient.) Legend : La nature offre un moyen universal de guérir et de préserver les hommes+. Bronze.

Rüppell, Beitrag zur Kenntniss, etc., 1876, p. 43.

Unknown to Kluyskens and Duisburg.

Dr. Ambroise Paré, of Paris. "Traicte . . . . de la petite Verole," etc. Paris, 1868, 12°. Already described.

Under Inoculation, there may be added

Dr. Benjamin Gale (1715-90), of Killingworth, Conn. "Dissertation on the Inoculation of the Small-Pox in America." (About 1750.)

905[a]. He received a medal from "a society in England" for the invention of an improved drill plough.

To the paper upon Inoculation by Dr. John Morgan, of Philadelphia, in 1776, reference was made in the last number of THE SANITARIAN, No. 1249.

Dr. Benjamin Rush, of Philadelphia. "The New Method of Inoculating for Small-Pox." Already described.

Under Vaccination, there come

Dr. Elisha Harris, of New York. "A Report on Laws, etc., for securing General Vaccination" (American Public Health Association Report, September, 1876), Cambridge, 1877, 8°. Already described.

Dr. Sir James Y. Simpson, of Edinburgh. "On the Results of Vaccination ; and the possible Prophylaxis, etc., of Scarlatina, Measles, and other Diseases." *Edinburgh Monthly Journal of Medical Science*, April, 1853, p. 363 ; "Obstetric Memoirs and Contributions," Edinburgh edition, ii., p. 481 ; Philadelphia edition, ii., p. 436. "Proposal to stamp out Small-Pox and other Contagious Diseases." Anæsthesia, Hospitalism, etc. Edited by (his son) Sir Walter G. Simpson.

Edinburgh edition, 1871, p. 543 ; New York edition, 1872, p. 543. Already described.

There is also an additional French medal of vaccination.

959[a]. Obverse as that of No. 959, save with DenonD.Andrieu F.

Reverse also similar, save without Denon Dir.

Cat. des poinçons, etc., p. 340, No. 60.

I am able now to give a description of No. 1218, in the January number of THE SANITARIAN.

Obverse the same as that of No. 1216, save S.C.Society. At top, a star between two dots.

Reverse. An oak wreath. Below, Lovett. White metal. 26.

This is in my collection.

To this group is to be added the following :

1216[a]. Same as No. 1216, save upon obverse, Cincinnati instead of Ohio State. Bronze, 32.

In my collection.]

XI. MILITARY AND NAVAL HYGIENE (*Continued*).

A. THE UNITED STATES (*Continued*).

Through the courtesy of Surgeon-General John Mills Browne, U.S.N., I have received an abstract of all the record evidence of the Navy Department regarding the medals conferred upon medical officers of the Navy by Congress, and the medals and decorations by foreign governments. I have hesitated about including these, as a few others also that have preceded, in an enumeration of sanitation pieces as such, but since they were the rewards of professional duty they have, perhaps, a claim to place. It will have been noticed that in no instance has a medal been numbered twice, unless there was reason to suppose that it represented a different grade of honor. Both biographically, and historically as concerns sanitation, every such mention may have its value.

Surgeons James Wells, Lewis Heerman, Samuel R. Marshall, M. T. Weems, John W. Dorsey, Larkin Griffin, J. Gra-

ham, and G. R. Jacques received swords of honor for their services during the attack, under Commodore Preble, on the Naval Force of Tripoli. (Act of Congress approved March 3d, 1805.)

1274. Surgeons Samuel R. Trevitt and Samuel Vernon, and Surgeon's Mate Walter W. New, received silver medals for the conflict under Captain Hull of the "Constitution," Captain Decatur of the "United States," and Captain Jones of the "Wasp," against the "Guerriere," "Macedonian," and "Frolic." (Act of Congress, January 29th, 1813.)

Loubat, *loc. cit.*, p. 153, No. 25, pl. XXVI.; p. 163, No. 27, pl. XXVIII.; p. 160, No. 26, pl. XXVII.

1275. Surgeons Amos A. Evans and Donaldson Yeates, and Surgeon's Mate John D. Armstrong, received silver medals, under Captain Bainbridge of the "Constitution," for the capture of the "Java." (Act of Congress, March 3d, 1813.)

Ibid., p. 166, No. 28, pl. XXIX.

1276. Surgeon Bailey Washington of the "Enterprise," under Lieutenants Burrows and McCall, received a silver medal for the conflict with the "Boxer." (Act of Congress, January 6th, 1814.)

Ibid., p. 71, No. 29, pl. XXX., and p. 174, No. 30, pl. XXXI.

Surgeons Samuel Horsley and Robert R. Barton, and Acting-Surgeon Usher Parsons, of Providence, R. I., under Captains Perry and Elliott, on Lake Erie, silver medals. (Act of Congress, January 6th, 1814.)

Ibid., p. 176, No. 31, pl. XXXII.; p. 183, No. 32, pl. XXXIII.

This, No. 1234, was given in the February number of THE SANITARIAN. The Parsons medal is now in possession of the Doctor's nephew, Mr. Edwin Parsons, of New York.

1277. Acting-Surgeon Charles Cotton, of Newport, R. I., and Surgeon's Mate Micajah Hawkes, under Captain Lawrence, silver medals, action of the "Hornet" with the "Peacock." (Act of Congress, January 11th, 1814.)

Ibid., p. 185, No. 33, pl. XXXIV.

1278. Surgeon William Caton, and Surgeon's Mate Gustavus R. Brown received silver medals for the victory on Lake Champlain, under Captains McDonough and Henley. (Act of Congress, October 20th, 1814.)

Ibid., p. 189, No. 34, pl. XXV.; p. 193, No. 35, pl. XXXVI.; p. 195, No. 36, pl. XXXVII.

1279. Surgeon Charles B. Hamilton, under Captain Warrington, of the "Peacock," silver medal for victory over the 'Epervier." (Act of Congress, October 21st, 1814.)

Ibid., p. 197, No. 37, pl. XXXVIII.

1280. Surgeon William M. Clark, and Surgeon's Mate Thomas Rogerson, under Captain Blakely of the "Wasp," silver medals for victory over the "Reindeer." (Act of Congress, November 3d, 1814.)

Ibid., p. 200, No. 38, pl. XXXIX.

1281. Surgeon Benjamin M. Kissan and Surgeon's Mate Samuel M. Kissan, under Captain Biddle of the "Hornet," silver medals for victory over the "Penguin." (Act of Congress, February 22d, 1816.)

Ibid., p. 249, No. 48, pl. XLIX.

1282. Surgeon John A. Kearney and Surgeon's Mates Benjamin Austin and Artemus Johnson, under Captain Stewart of the "Constitution," silver medals for capture of the "Levant" and "Cyane." (Act of Congress, February 22d, 1816.)

Ibid., p. 245, No. 47, pl. XLVIII.

In the February number of THE SANITARIAN I spoke of this medal having been conferred upon Surgeon Lawrence Kearney, an error in his Christian name.

In the same connection I mentioned that Passed Assistant Surgeon E. K. Kane had received what is technically termed "a token of thankfulness from the Government of Great Britain" (Act of Congress, August 30th, 1856), and that a medal had been voted to him by our own Government (Act of Congress, March 3d, 1857), which Loubat, in 1878, said had not then been struck. Surgeon-General Browne has since then ascertained for me from the Treasury Department that this neglect has never been made good.

The acceptance of "presents" from the Government of Japan, by the medical officers of the "Niagara," was authorized by Act of Congress, July 25th, 1862. Also of "a piece of plate" from the Government of Great Britain, by Surgeon Solomon Sharp, for his kindness to the officers of the "Greyhound," while at the Naval Hospital at Norfolk, Va., under his care. (Act of Congress, June 7th, 1864.) Also of decora-

tions from the King of Portugal, by Surgeon A. L. Gihon, Passed Assistant-Surgeon C. H. White and Assistant-Surgeon J. H. Kidder, for their humane services to an officer of the Portuguese Navy. (Act of Congress, May 26th, 1870.)

1283. Silver medals were given by the King of Siam to the medical officers of the "Monocacy." (Act of Congress, June 17th, 1874.)

Surgeon James Laws and Assistant-Surgeon John Kane (a brother of the explorer), of the expedition in search of Dr. E. K. Kane and for traces of Sir John Franklin, received the Arctic medal of 1855 from Queen Victoria, at the time of the return of the "Resolute" to the British Government. I owe knowledge of this to Medical Director T. J. Turner, U.S.N., and have received from Dr. Laws a full description of the medal. It seems identical with No. 1248, mentioned in connection with Dr. E. K. Kane.

It has been suggested to me that the naval surgeons in charge of the Atlantic Cable Expedition also received medals, but as yet I have been unable to verify the fact.

From Surgeon J. S. Billings, U.S.A., I have learned of the following :

1284. The order of the Mejedieh, conferred upon the late Assistant-Surgeon William J. Wilson, U.S.A., in June, 1877, by the Khedive of Egypt.

This is the only instance, so far as Surgeon Billings has been able to ascertain from the Government records, in which a medical officer of the U. S. Army has been thus honored with a medal.

From other sources, there may be added :

Acting Assistant-Surgeon J. F. Pratt, U.S.A.

1285. Obverse. Head, to right. Inscription : Lincoln.

Reverse. Inscription : A piece of copper taken from the wreck of the rebel ram Merrimac, in 1862, by J. F. Pratt, Acting Assistant-Surgeon, U.S.A. Only ten struck.

Copper. 16. Dies by J. A. Bolen, of Springfield, Mass.

Mercer, *Numismatic Directory*, 1881, p. 40.

1286. Dr. Mary E. Walker, of Washington. Congressional medal of honor. *Medical and Surgical Directory of the United States*, 1886, p. 214.

I have received from Mr. J. B. Hubbell, Field Agent of the American National Red Cross, photographs of a portion of the decorations conferred upon Miss Clara Barton, President of the Association, in addition to that already mentioned, No. 1227. They are

1287. Silver medal from the Comité International de la Croix Rouge, for securing the adhesion of the United States to the Treaty of Geneva.

1288. Silver medal from the Empress Augusta, of Germany, for deeds of charity and humanity.

Miss Barton has also received the following :

Servian decoration of the Red Cross from the Queen of that country, in recognition of services to humanity ; German Iron Cross of Merit, for labors in the Franco-German War ; Gold Cross of Remembrance from the Grand Duke and Duchess of Baden, for labors during and following the Franco-German War in the destroyed cities of France and Alsace-Lorraine ; Red Cross pin from the Grand Duchess of Baden ; a "jewel" of amethyst and pearls, from the same ; National W. R. C. honorary badge of gold and diamonds, for services to humanity ; ordinary badge of d°. ; G. A. R. badge ; d°. from the German-American soldiery, for services in the Franco-German War ; a Masonic testimonial ; and a Red Cross pin.

There are a number of persons, not physicians, who have received medals from societies, industrial and other expositions, and even national governments, for inventions, etc., relative to military and naval hygiene. Of such I possess very many notes which have a certain interest. Upon consideration, however, I have decided not to admit them here.

B. British America.

Dr. John Theophilus Jenkins (1829–), of Charlottetown, P. E. I. Received both British and Turkish medals for his services during the Crimean War.

Dr. John Rae (1813–), Arctic Explorer and Surgeon, Hudson's Bay Company's Service. Founder's Gold medal Royal Geographical Society of London, 1852. Already mentioned, No. 1232.

Surgeon Christopher Widmer (1780–1858), of Toronto. Medal with five clasps, for Peninsular Campaign.

In this connection it may be stated that Mrs. Newton, of Toronto, was one of four army nurses to receive the Crimean medal from Queen Victoria. Mrs. Newton was shot through her knee in a trench before the Redan.

C. Great Britain.

Dr. Thomas Alexander, Director-General Army Medical Department.

1289. Obverse. Bust, to left. J. S. and A. B. Wyon Sc. Inscription : Thomas Alexander C : B : Dir : Gen : A : M : D : 1858–1860

Reverse. Hygeia seated, to left, holding patera from which a serpent, entwined about her arm, drinks. At left, in rear, two army tents. Helmet and sword to right. Beneath, small wand of Æsculapius, lying horizontally. J. S. and A. B. Wyon Sc. No inscription. Bronze. 27. 43 mm.

In the Fisher Collection.

Dr. Sir Patrick Dun (1642–1713), of Dublin, Physician-General of the Army in Ireland.

1290. Obverse. A woman holding an infant, with young children at her side. Inscription : Sir Patrick Dun's Hospital Maternity. Exergue : Founded A.D. 1867. In small letters, J. Woodhouse

Reverse. Inscription : Haughton Maternity Medal | (rosette). Instituted A.D. 1869 (rosette). Within field : Awarded | To (here name of recipient.) Silver, bronze. 32. Edges milled.

Frazer, *loc. cit.*, July, 1887, p. 193.

In my collection, in silver, the gift of William Frazer, Esq., of Dublin. I did not know of its existence when publishing upon the medals of obstetrics. The Maternity was established by Rev. Samuel Haughton, M.D., and "besides its usefulness as a local charity, has trained a number of efficient nurses, many of whom became employed in regiments at home and abroad."

Dr. James Freind, of Oxford. Was a military surgeon. Already described, under Section X., Small-Pox.

Dr. John Howard, of London. "Lazarettos in Europe," etc., 1789, 4°. Already mentioned under Section I.

Dr. John Hunter, of London. "A treatise, etc., and Gun-Shot Wounds," edited by Sir Everard Home, London, 1794, 4°. Described under Section X., Syphilis, Nos. 1143–4–5, and subsequently, No. 1143ª.

Dr. Edward Jenner, of Berkeley, Gloucestershire. His medal, presented by the Surgeons of the Royal Navy of Great Britain, was described, No. 926, under Section X., Vaccination.

Professor Sir Thomas Longmore (1816–), of Netley. "A Treatise on Gun-Shot Wounds," 1862, 8°; and some twenty or more other works upon military surgery.

Dr. Longmore's photograph was introduced upon the reverse of the Montifiore medal, No. 1292, next but one to follow.

Professor Sir James Ranald Martin (1793–1874), of Netley.

1291. Obverse. Within a circle, the field being reticulate and filled with minute crosses, a coat-of-arms of lion rampant and holding a crescent, above a shield, upon which three crescents. Upon a scroll beneath: Hinc Fortior—Et Clarior. Inscription: In Memory Of Sir James Ranald Martin C.B.

Reverse. Within a circle, with scroll-work above and beneath: Army | Medical School Inscription: Prize For Military Medicine | · Founded 1876 · Bronze. 22½. 36 mm.

In the Fisher Collection.

Dr. Richard Mead, of London. "An Historical Account of a New Method for extracting the Foul Air out of Ships." Medical Works, 1762. Already mentioned.

Mr. Nathaniel Montefiore, F.R.C.S. Founder of prize medal in Military Surgery at Army Medical School, Netley.

1292. Obverse. Coat-of-arms. Upon a scroll, Think & Thank. Inscription: Ex Donis. N. Montefiore, F:R:C:S:Schol: Mil:Med:1881.

Reverse. A wounded soldier upon stretcher, attended by surgeon and men of ambulance corps. In distance ambulance-wagon and two men carrying a wounded one upon stretcher. Legend: *Ιητρος γαρ ανηρ πολλων ανταξιος αλλων* Alphée Dubois (f.) Bronze. 39.

In the Lee Collection.

As the history of the Montefiore medal seems as yet unpublished, I present it at length, as obtained for me by Surgeon

J. S. Billings, U.S.A., of Washington, from Professor Longmore, of Netley:

"These prizes are two in number, and are awarded at the close of each course of instruction to the two Surgeons on Probation who evince the highest proficiency in the subject of Military Surgery. The first prize consists of the Montefiore Bronze Medal and twenty guineas; the second, of a collection of works on military surgery.

"In the spring of the year 1881, Mr. Nathaniel Montefiore, F.R.C.S.,* having observed there was no prize available for distribution in the department of Military Surgery at the Army Medical School, offered to give a sum of £2000 for the purpose of founding one. This generous proposal was submitted through the Director-General, A.M.D., for the consideration of the Right Hon. the Secretary of State for War, and the Secretary of State was pleased to accept the offer. Mr. Montefiore left the arrangements for the disposal of the fund to the governing body of the Army Medical School, and after due consideration it was determined to appropriate the proceeds of the fund to the establishment of the two prizes above described.

"The subjects engraved on the medal were arranged by Professor Longmore, the chief purpose being to illustrate a military surgeon's duty in attending to wounded men in the field, and at the same time to represent the principal articles of ambulance equipment, together with the uniforms of the officers and men of the army medical department, of the day. The objects selected were disposed in a suitable drawing by Inspector-General J. D. Macdonald, R.N., then Professor of Naval Hygiene at Netley. The reverse face of the medal bears the arms and name of the founder of the prize and the date of its foundation.†

"It seems necessary to explain the fact of the medal having been engraved by the French artist whose name it bears. As soon as the drawings for the medal were completed, the work was submitted to a leading firm of English medallists‡ for

* Mr. Montefiore and Professor Longmore were friends and in early days fellow-students at Guy's Hospital.

† Engraved from a sketch by my eldest daughter, T. L.

‡ Messrs. Wyon & Co., who preferred a classical subject and wished to furnish the design themselves.

execution ; but the designs as proposed, being declared by them unsuited for medallic effect, the work was then offered to the eminent French medallist, M. Alphée Dubois, of Paris, who both expressed his approval of the plan and at once offered to undertake the execution of it. The result has been regarded as most satisfactory by all who have seen the medal.

" The medal, the cost of which (£100) was also defrayed by Mr. Montefiore, was first awarded in February, 1882. The dies are kept in the Government Mint at Paris, and the medals can only be struck by orders through certain official channels.

" The Montefiore Prize Medal is perhaps peculiar in having words from five different languages upon it ; the line from Homer above the field group, Greek ; the Ex donis, etc., on the reverse face, Latin ; the Jerusalem on the pennon, Hebrew (the Montefiores are a well-known Jewish family) ; the motto of the Montefiore arms, ' Think & Thank,' English ; and the name of the artist, French.

" In order to give the uniform, stretcher, wagons, etc., correctly, I arranged some groups on the ground at Netley, and had them photographed. The surgeon bandaging the wounded leg was taken from a photograph of myself ; a friend at Netley sent it to M. Dubois without my knowing of it at the time."

Miss Florence Nightingale (1820–), of London. " Army Sanitary Administration, and its Reform under the late Lord Herbert." London (1862). " Observations on the Sanitary State of the Army in India," 1863.

1293. Obverse. An oblong oval surrounded by wreath of flowers. Within, Miss Nightingale, with hand to left, seated and reading. Inscription : Florence Nightingale. Also, Pinches, London.

Reverse. Within an oval, the Victoria Cross, upon which a crown and V.R. Within a wreath : Blessed Are The Merciful. Upon band at base, Crimea. Three stars above. Inscription : As A Mark Of Esteem And Gratitude For Her Devotion To The Queens Brave Soldiers. Bronze, white metal. 24.

This is in the Lee Collection, and that of Mr. F. C. Browne, of Framingham, Mass., from whom I have impressions. Reference has been previously made to Miss Nightingale under Section I.

Surgeon Edmund Alexander Parkes (1819–76), of Netley. "A Manual of Practical Hygiene, prepared especially for Use in the Medical Service of the Army." London, 1864, 1866, 1869, 1873, 1883, 1887; Philadelphia, 1873, 1878, 1883, 1887. "On the Increase of a Spirit Ration during the Ashantee Campaign." London, 1874, 1875, 8°. "Public Health. Revised by William Aitken. To which is added a short paper containing Hints to the Medical Officers of the Arctic Expedition under Captain Nares," etc., London, 1876, 12°.

I am at last enabled to complete the description of No. 57 (THE SANITARIAN, Hay, 1887, p. 449).

Obverse. Head, to right (not view of hospital at Netley, as formerly quoted). Legend, Greek, as there given. Inscription: Edmund Alexander Parkes. B. 1819. D. 1876.

Reverse. Within wreath: Parkes Memorial Medal. Inscription: Army Medical School Hygiene. Gold, bronze. 32.

In the Fisher Collection.

Dr. Parkes has already been mentioned under Section I., and Yellow-Fever, No. 1066[a]. Other Netley medals are Nos. 1291 and 1292.

Assistant-Surgeon Frederick Henry Rose (1833–1873), R. N. Gold medal from U. S. Congress. Aready mentioned, No. 1078 under Section X., Yellow-Fever.

Professor Sir James Young Simpson, of Edinburgh. "Was the Roman Army Provided with Medical Officers?" Edinburgh, 1851.

Dr. Simpson is also of interest in this connection, because of his publications upon chloroform anæsthesia and hospitalism. Already mentioned in a previous Section.

(*To be continued.*)

ELASTIC MUCILAGE.—Dissolve 1 part of salicylic acid in 20 parts of alcohol, add 3 parts of soft soap and 3 parts of glycerine. Shake thoroughly and add the mixture to a mucilage prepared from 93 parts of gum arabic and the requisite amount of water (about 180 parts). This mucilage keeps well, and when it dries remains elastic without tendency to cracking.

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

NATIONAL PROTECTION AGAINST EPIDEMIC DISEASES.

An Act to prevent the introduction of contagious diseases from one State into another and for the punishment of certain offences.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That whenever it shall be made to appear to the satisfaction of the President that cholera, yellow-fever, small-pox, or plague exists in any State or Territory, or in the District of Columbia, and that there is danger of the spread of such disease into other States, Territories, or the District of Columbia, he is hereby authorized to cause the Secretary of the Treasury to promulgate such rules and regulations as in his judgment may be necessary to prevent the spread of such disease from one State or Territory into another, or from any State or Territory into the District of Columbia, or from the District of Columbia into any State or Territory, and to employ such inspectors and other persons as may be necessary to execute such regulations to prevent the spread of such disease. The said rules and regulations shall be prepared by the Supervising Surgeon-General of the Marine-Hospital Service, under the direction of the Secretary of the Treasury. And any person who shall wilfully violate any rule or regulation so made and promulgated shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than five hundred dollars, or imprisonment for not more than two years, or both, in the discretion of the court.

SECTION 2. That any officer, or person acting as an officer, or agent of the United States at any quarantine station, or

other person employed to aid in preventing the spread of such disease, who shall wilfully violate any of the quarantine laws of the United States, or any of the rules and regulations made and promulgated by the Secretary of the Treasury as provided for in section one of this act, or any lawful order of his superior officer or officers, shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than three hundred dollars, or imprisonment for not more than one year, or both, in the discretion of the court.

SECTION 3. That when any common carrier or officer, agent, or employé of any common carrier shall wilfully violate any of the quarantine laws of the United States, or the rules and regulations made and promulgated as provided for in section one of this act, such common carrier, officer, agent, or employé shall be deemed guilty of a misdemeanor, and shall, on conviction, be punished by a fine of not more than five hundred dollars, or imprisonment for not more than two years, or both, in the discretion of the court.

Approved March 28th, 1890.

"This Act," we are informed by Surgeon-General Hamilton, United States Marine-Hospital Service (Abstract of Sanitary Reports, No. 14, April 4th, 1890), "is the outgrowth of the necessities of the Service in the administration of interstate quarantine during the last epidemic of yellow-fever. It was prepared in this Bureau last year, and transmitted, after amendment, by the Secretary of the Treasury to the Chairman of the Committee on Epidemic Diseases of the Senate. It was further amended by the committee and reported. Owing to the lateness of the season, no further action was taken. Shortly after the opening of the present Congress the Chairman, Hon. Isham G. Harris, reintroduced it, and in due course secured its passage through the Senate. It was again amended in the Commerce Committee of the House of Representatives, which amendments being concurred in by the Senate, it finally passed."

But it appears to us that "This Act," instead of being the outgrowth of the necessities of the service in the administration of interstate quarantine during the last epidemic of yellow-fever, a year and a half ago, is the outcome of the per-

sistent effort of the United States Marine-Hospital Service since 1879—initiated by the late Surgeon-General John M. Woodworth, Dr. Hamilton's predecessor. However this may be, and notwithstanding the opposition against which Dr. Hamilton has had to contend in bringing it about, it is in the highest degree creditable to him ; and the more for the still further elaboration of the service under his direction, now known to be in progress for the competent inspection abroad of all proposed emigrants to this country, and again of all immigrants before, or at the time of landing.

We know of no reason why this service should conflict with such restrictions as exist under State laws under any circumstances. If any such restrictions are imperfect, or are in time of trial found to be inefficient, they may, indeed they *should* be supplemented though not supplanted by national service.

Whatever may be said of the Marine-Hospital Service in the past—of its original intent to take care of sick sailors and disburse the sick dues—that is mere matter of history.

It is not to its discredit that it had a small beginning—most great things have had. Nor has its growth by any means been confined to mere quantity. Quality is its present leading virtue, and it is so completely appointed, supported, and equipped by the Treasury Department of the United States as to greatly excel any of the proposed plans hitherto submitted against the introduction and spread of epidemic diseases.

THE SANITARIAN would not be misunderstood with regard to its attitude on the question of national sanitation under the auspices of the Marine-Hospital Service. It is no less ready now than ever heretofore to expose and condemn whatever appears to be inconsistent with the best means of protecting and promoting the public health, as a hopeful means of changing the current.

What the National Board of Health might have done had it been sustained, under its altogether too modest demands upon the national treasury, considering the magnitude of the undertaking, is surmise only. What it did do during its short life was to lay the foundation of a more elaborate service than it ever contemplated and to spur the ambition of the Surgeon-General of the Marine-Hospital Service to supplant it. His success shows such a comprehensive grasp of the subject,

such tact in securing support, and such executive skill in organizing it, as ought to secure for him the support and co-operation of all who are interested, official or otherwise, in the protection of the public health.

THE WELLS RUSTLESS IRON COMPANY—CORRECTION OF A MISTAKE.

32 John St., New York, May 8, 1890.

Editor of THE SANITARIAN.

DEAR SIR: In your issue of March you made a very great mistake in stating that the Wells Rustless Iron Pipe was made in Pittsburgh, and also in stating it was treated with acid.

Both these statements are wrong.

The Wells Rustless Iron Pipe, which is the *only* satisfactory and merchantable oxidized pipe in the market, is made at Little Ferry, N. J., where we have large works.

Our furnace has an oxidizing chamber 23 feet long by 6 feet wide.

Our process is the latest discovery in the art of oxidizing iron to make it rustless, and being very simple, is *always* effective.

The sale of our pipe is constantly extending, and we are now supplying customers all over this country and in parts of Canada.

Our "Rustless" Wrought Iron Pipe is undoubtedly the very best pipe that is made for conveying water. We will gladly send descriptive catalogue to any one who is interested in knowing further about us.

Respectfully yours,
THE WELLS RUSTLESS IRON CO.

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

CORRESPONDENTS under this head are particularly requested to be prompt.

ALABAMA.—*Mobile*, 40,000: Reports 67 deaths during March, of which 14 were under five years of age. Annual death-rate, 20.1 per 1000. From zymotic diseases, 7, and from consumption, 11.

CALIFORNIA.—For the month of March, 1890, the Secretary's abstract of the reports received from 101 cities and towns, with an aggregate population of 855,600, the number of deaths was 1189. Annual death-rate, 16.56. Deaths from consumption during the month, 233. From zymotic diseases: Diphtheria and croup, 28; typhoid-fever, 23; cerebro-spinal-fever, 13; diarrhœal diseases, 8; whooping-cough, 5; scarlatina, 1; acute respiratory diseases, 205.

San Francisco, 330,000: Reports 600 deaths. Annual death-rate, 21.08.

Los Angeles, 80,000: Reports 62 deaths. Annual death-rate, 9.3.

Oakland, 60,000: Reports 100 deaths. Annual death-rate, 20.0.

Sacramento, 35,000: Reports 44 deaths. Annual death-rate, 15.08.

CONNECTICUT.—For the month of March, 168 towns, with an aggregate population of 759,022, report 1097 deaths, 233 being under five years of age. Annual death-rate, 17.3 per 1000. Deaths from zymotic diseases numbered 147, and from consumption, 137; acute respiratory diseases, 207.

The small-pox epidemic at Meriden, as reported by the Secretary of the State Board in a previous issue, is now thought to be over in that city. The Secretary reports:

"There were in the two months of February and March 26 cases reported to the health authorities, of whom 10 died.

"This was the most extensive and fatal epidemic of small-pox that has ever occurred in any town or city in Connecticut since the organization of the State Board of Health.

"The following statement concerning its origin in Meriden has been reported at this office. A man boarding with a saloon-keeper in Meriden visited Windsor Locks during the prevalence of the disease in that place. After his return he was ill and had an irruption, which was thought so suspicious that he was kept out of view in his rooms until it had disappeared, and advised to say nothing about it. In due time the little daughter of the saloon-keeper was also taken sick and had an irruption; and her physician reported it to the City Health Committee as varioloid. A consultation with other

physicians was held upon the case, and the majority being of opinion that it was chicken-pox and not varioloid, the Health Committee took no precautions about it. The case was not even kept under observation for the brief time necessary to settle the doubt concerning it.

"The experience of Meriden will afford a notable illustration of the importance of immediate notification of every infectious disease, and of the danger of neglecting any cases about which there is reasonable uncertainty of the diagnosis.

"It is only right to expect that in future under the present organization of local boards of health in every town in Connecticut, such attention and care will be given to every real or suspicious case that an extensive and fatal epidemic of small-pox like the recent one in Meriden will not soon occur again."

New Haven, 85,000: Reports 149 deaths. Annual death-rate, 19.3.

Hartford, 52,000: Reports 94 deaths. Annual death-rate, 17.3.

Bridgeport, 49,000: Reports 76 deaths. Annual death-rate, 18.1.

DISTRICT OF COLUMBIA.—Annual Report of the Health Officer for the fiscal year ending June 30th, 1889: Population, January 1st, 250,000—170,000 white; 80,000 colored. The total mortality for the year was 5152; of this number 1458 were white males, 1255 white females, 1180 colored males, and 1259 colored females; showing an annual death-rate for the year of 20.60 per 1000 per annum. The death-rate of the white population reached only 15.96 per 1000 per annum, the lowest ever known in the history of vital statistics in the District, while that of the colored population was 30.49 per 1000 per annum.

The annual death-rate for the year is lower than that of any one of the twelve preceding years, and lower by 2.97 per 1000 per annum than the average death-rate for the past fourteen years—white, 18.52; colored, 33.63: 23.57.

The death-rate of the colored population is still on the decrease, being 3.62 per 1000 per annum lower than the mean average for the past thirteen years.

The death-rate in the zymotic class of diseases was 4.95 per 1000 per annum as against 4.99 for last year.

Consumption caused during the year 697 deaths, or 11.25 per cent of the total mortality of the whites and 16 per cent of the colored; but there has been a continuous decrease from this cause since 1886, notwithstanding the increase in population, there having been 796 deaths in 1886, 736 in 1887, and 702 in 1888.

Two thousand and eighty-nine, or 40 per cent of the deaths from all causes, and 52 per cent of all the births reported were of children under five years. Fourteen hundred and sixty-eight, or 70 per cent, were of children under one year, composing about 6 to every 1000 of population, and 36.6 per cent of the births reported. In respect to race 634 were white and 834 colored. The principal causes prevailing among the latter decedents were diarrhœal diseases, 316; acute lung diseases, 158; incidents of birth, 254; inanition, 97; marasmus, 79; infantile convulsions, 110; whooping-cough, 71, and dentition, 42. Although the white population is estimated as being twice that of the colored, yet it will be seen that the deaths of the colored infants exceed the white by 200. This material difference in the death-rate is attributed to the location of the colored people in alleys and unhealthful parts of the city, unsanitary surroundings, and improper food.

Total deaths during five weeks ending March 29th, 435, of which 158 were under five years of age. There were 247 deaths in the colored population. Annual death-rate, 22.2. Zymotic diseases caused 60 deaths, consumption, 84, and acute respiratory diseases, 84.

Illinois.—Special Report on Medical Education and the Regulation of the Practice of Medicine in the United States and Canada, 1765–1890, by John H. Rauch, M.D., Secretary of the State Board of Health, comprises a concise summary of the progress made during recent years in, and the present status of, medical education, together with an abstract of the statute laws and college requirements.

By comparing the tables, it appears there are now 139 colleges in existence against 129 in 1886 and 131 in 1889: 126 in the United States and 13 in Canada. 149 institutions have become extinct, including 18 that were fraudulent.

The total number of graduates in the United States in 1881–82 was 4555; in 1888–89, 4337. The percentage of graduates to matriculates for the former period was 36.3; for the latter, 31.6.

Chicago, 1,100,000: Reports for March 2065 deaths, of which number 922 were under five years of age. Annual death-rate per 1000, 22.52. From zymotic diseases there were 371 deaths, from consumption, 191, and from acute lung diseases, 464.

LOUISIANA.—The State Board of Health has been reorganized. Dr. R. S. Olliphant has been appointed President by the Governor in place of Dr. C. P. Wilkinson, who has, with great credit to himself and eminent satisfaction to the city of New Orleans, filled the office since the retirement of Dr. Holt. However, though the executive office is new to Dr. Olliphant, *he* is not new to the health service, having served his time—so to speak—with credit in other relations, under the excellent administration of Dr. Holt. And supported, as he appears to be, by a board of experienced members, there is reasonable ground to expect that the high standard of the health service established by his predecessors will continue to be maintained.

As at present constituted, the board consists of Dr. R. S. Olliphant, President; Dr. Lucien Salomon, Secretary; Drs. Felix Formento and Henry Bezou, and Messrs. Hill, Clayton, and King; Dr. H. W. Blanc, Chief Sanitary Inspector.

New Orleans, 254,000: During the five weeks ending March 29th there were 685 deaths, of which 164 were under five years of age. There were 247 deaths in the colored population. Annual death-rate per 1000, 28.14. From zymotic diseases there were 120 deaths, from consumption, 80, and from acute respiratory diseases, 78.

The New Orleans Auxiliary Sanitary Association continues its progressive work in a variety of ways—most recently in the initiation of measures for the establishment of public bath-houses.

MARYLAND.—*Baltimore*, 500,343: During the five weeks ending March 29th there were 1036 deaths, of which 396 were

under five years of age. Annual death-rate, 21.6 per 1000. There were 171 deaths from zymotic diseases, and 132 from consumption.

MASSACHUSETTS.—*Boston*, 420,000 : Reports for the month of March 860 deaths, of which number 277 were under five years of age. Annual death-rate per 1000, 24.57. From zymotic diseases there were 110 deaths, and from consumption, 133.

MICHIGAN.—The Secretary reports for the month of March, 1890 : Compared with the preceding month, the reports indicate that cholera infantum increased and that typho-malarial-fever, cholera morbus, inflammation of brain, diphtheria, and puerperal-fever decreased in prevalence.

Compared with the average for the month of March in the four years 1886–89, inflammation of kidney, influenza, and cerebro-spinal meningitis were more prevalent, and typho-malarial-fever, puerperal-fever, diphtheria, typhoid-fever, inflammation of brain, cholera morbus, scarlet-fever, dysentery, and intermittent-fever were less prevalent in March, 1890.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of March, 1890, at sixty-one places, scarlet-fever at seventy places, typhoid-fever at twenty-five places, measles at one hundred and eleven places, and small-pox at one place.

Reports from all sources show diphtheria reported at three places more, scarlet-fever at seven places less, typhoid-fever at nine places less, measles at forty-two places more, and small-pox at one place less in the month of March, 1890, than in the preceding month.

Detroit, 250,000 : Reports for the month of March 325 deaths, of which 65 were under five years of age. Annual death-rate, 15.30 per 1000. From zymotic diseases there were 59 deaths ; from consumption, 32.

MINNESOTA.—Distribution and mortality from specified diseases for the month of March, 1890, reported up to April 20th. (Population 1889, estimated, cities over 2000 inhabitants, 539,900 ; towns and villages, 1,047,860.) Total number

of deaths, 864, against 859 previous month, and 1091 for the corresponding month of 1889; 51 per cent occurred in cities of more than 2000 population.

Measles—3 deaths, males, in 3 localities, 3 counties, 2 in cities.

Scarlatina—9 deaths (3 males, 6 females), in 9 localities, 9 counties; 33 per cent occurred in cities.

Diphtheria—37 deaths (18 males, 19 females), in 22 localities, 20 counties; 46 per cent occurred in cities.

Croup—9 deaths (4 males, 5 females), in 7 localities, 7 counties; 44 per cent occurred in cities.

Typhoid-fever—11 deaths (8 males, 3 females), in 10 localities, 9 counties; 45 per cent occurred in cities.

St. Paul, 180,000: Reports for March 111 deaths, of which 56 were under five years of age. Annual death-rate, 7.40 per 1000. From zymotic diseases, 13, and from consumption, 12.

MISSOURI.—*St. Louis*, 450,000: Reports for March 675 deaths, of which number 232 were under five years of age. Annual rate of mortality, 18.0 per 1000. From zymotic diseases there were 87 deaths, and from consumption, 75.

NEW HAMPSHIRE.—Eighth annual report, embracing eighteen months, May 1, 1888, to October 31, 1889, in order that the fiscal year of the Board may hereafter conform to the time of the meeting of the Legislature.

Sanitary progress is marked throughout the State by increased attention to the purity of the water supplies, drainage and sewerage, and to the sanitary condition of school-houses. Monthly returns from the local boards of health, of the prevalence of contagious and infectious diseases, particularly of diphtheria and scarlet-fever, are now quite promptly made from a majority of the towns, and confidence is expressed in the ability of the State Board of Health with the co-operation of the medical profession and of the local boards of health as at present, and in the process of being constituted, to successfully contend against the introduction or extensive prevalence of any epidemic disease.

The almshouses of the State have been made the special subject of examination, and, on the whole, much improved in

their sanitary appointments, but in some the defects in construction as well as appointments are such as to require continuous attention.

As Commissioners of Lunacy, by act of the Legislature, in 1887, the duties and responsibilities of the Board have been largely increased—sufficiently to realize more than ever before the great need there was for special legislation in behalf of the most needful of all State dependents, especially with regard to medical treatment; the care hitherto having been almost wholly confined to mere food and quarters. Many inmates of the asylums have been found of good intellects, with no structural disease of the brain, and offering good promise of successful medical treatment, which has not been provided.

Reports and Special Papers: Water and Water Analysis in Relation to Disease, by Professor E. R. Angell; Treatment of the Drowned, by the Board; Chest Development in Young Persons, by J. J. Berry, M.D., member of the Board; Abstract of the Proceedings of the American Public Health Association, at Milwaukee, 1888; Poisonous Wall-Paper, by Professor E. R. Angell; Practical Sanitary and Economic Cooking, by Mrs. Mary Hinman Abel (the Lomb prize essay); Pulmonary Tuberculosis, by Irving A. Watson, Secretary of the Board; and How Far May a Cow be Tuberculous before her Milk becomes Dangerous as an Article of Food, by Harold C. Ernst, A.M., M.D., comprised in the volume, are all papers of much practical utility and worthy of extensive circulation.

NEW JERSEY.—*Paterson*, 85,000: Reports 152 deaths during March, of which number 44 were under five years of age. Annual death-rate, 21.4 per 1000. There were 19 deaths from zymotic diseases, and 25 from consumption.

Hudson County, 292,734: Reports 605 deaths during March, of which number 250 were under five years of age. Annual death-rate, 24.8 per 1000. There were 107 deaths from zymotic diseases and 66 from consumption.

During the year 1889 there were 6776 deaths, of which number 3051 were under five years of age. Death-rate per 1000, 24.0. The deaths from zymotic diseases numbered 1697, and from consumption, 664.

Newark, 191,305: Reports for the year 1889 total number

of deaths 4629, of which number 1963 were under five years of age. The death-rate per 1000 was 24.23—an increase over that for 1888, when the rate was 22.96. There were 1014 deaths from zymotic diseases and 485 from consumption.

NEW YORK.—The Secretary of the State Board of Health reports in the monthly Bulletin for March: In comparison with the reported mortality of previous corresponding months, it exceeds the average of the same month for five years by 844, the difference being much less marked than it was in January and February. The average daily death-rate was 299 in March, 306 in February, and 398 in January. While it is thus evident that the extraordinary increase in the mortality of the State in January and February, due to epidemic influenza, has to a large degree subsided, there have been still a considerable number of deaths certified to as due directly or indirectly to so-called "Grippe." The mortality from acute respiratory diseases also continues above the average, which is about 19 per cent of the total mortality for March, that of the present month being 21 per cent. From consumption there were in each 1000 deaths 129.13; the average of other years in March has been about 125.50. A similar increase is shown in the proportion of deaths from diseases of the digestive and nervous systems and also among unclassified diseases. A considerable proportion of deaths ascribed to influenza have occurred among those of advanced age; the proportion of deaths from old age is, however, below the average. It is evident that the results of the disease have shown themselves mainly on those from various causes weakly and in a fatal termination a number of weeks subsequent to its occurrence in acute form. Measles is reported as prevalent in numerous localities and its death-rate is increasing. Small-pox, from which the State has been free for months, developed in Cohoes about March 1st, and twelve cases have occurred, all limited to one house; its origin has not been satisfactorily determined; one case, originating in Cohoes, has developed in Schenectady. Two deaths are also reported from it by New York City.

New York, 1,622,000: Total deaths, 3339—36 per cent under five years. Annual death-rate, 24.24. From zymotic diseases there were 439 deaths, and from consumption, 475.

Brooklyn, 852,467 : Total deaths, 1513—37.4 per cent under five years. Annual death-rate, 20.88. From zymotic diseases there were 208 deaths, and from consumption, 182.

Buffalo, 230,000 : Total deaths, five weeks ending March 29th, 417—38.8 per cent under five years. Annual death-rate, 18.81. From zymotic diseases there were 58 deaths, and from consumption, 46.

Rochester, 130,000 : Total deaths, 192—30.0 per cent under five years. Annual death-rate, 17.72. From zymotic diseases there were 19 deaths, and from consumption, 31.

Albany, 103,000 : Total deaths, 203—24.9 per cent under five years. Annual death-rate, 23.66. From zymotic diseases there were 26 deaths, and from consumption, 32.

Syracuse, 87,000 : Total deaths, 137—27.0 per cent under five years. Annual death-rate, 18.9. From zymotic diseases there were 13 deaths, and from consumption, 18.

NORTH CAROLINA.—For the month of March there were reported 99 deaths in a population of 85,500, representing an annual death-rate of 13.9 per 1000. Deaths under five years, 28. There were 7 deaths from zymotic diseases, and 18 from consumption.

Raleigh, 15,000 : Total deaths, 23. Death-rate, 18.4 per 1000.

Charlotte, 13,000 : Total deaths, 25. Death-rate, 23.1 per 1000.

Asheville, 12,000 : Total deaths, 10. Death-rate, 10.0 per 1000.

OHIO.—Forty-eight cities and towns, with an aggregate population of 1,271,800, reported for the month of March 1826 deaths, of which number 630 were under five years of age. Annual death-rate, 17.23 per 1000. There were 367 deaths from zymotic diseases, and 244 from consumption.

Cincinnati, 325,000 : Total deaths, 569. Annual death-rate per 1000, 20.01.

Cleveland, 235,000 : Total deaths, 493. Annual death-rate per 1000, 25.11.

Columbus, 101,000 : Total deaths, 108. Annual death-rate per 1000, 12.83.

Toledo, 89,000 : Total deaths, 136. Annual death-rate per 1000, 17.74.

PENNSYLVANIA.—*Philadelphia*, 1,064,277 : Reports for five weeks ending March 29th, 2127 deaths, of which 679 were under five years of age. Annual death-rate, 20.8 per 1000. From the principal zymotic diseases there were 218 deaths, and from consumption, 302.

Reading reports for the year 1889 : Population, 59,655 ; marriages, 686 ; births, 1586 ; deaths, 891. Three hundred and eighteen, or 35.7 per cent of the deaths, were of children under five years. One hundred and eighty-nine were caused by zymotic diseases, and 108, or 12.12 per cent, caused by consumption. Of the deaths from zymotic diseases, 75 were caused by infantile diarrhœa, 36 by diphtheria and croup, 26 by typhoid-fever, and 13 by scarlet-fever. Death-rate, 14.9.

Sewerage is urged as the prime necessity for lessening the ratio of deaths from preventable diseases.

RHODE ISLAND.—During the month of March there were 532 deaths in a population of 296,140, representing an annual death-rate of 21.5 per 1000.

No contagious or infectious disease was reported as prevailing during March in any very extended or epidemic degree.

Compared with the previous month, typhoid-fever and whooping-cough were reported from a larger number of localities, and in greater numbers in sporadic form ; diphtheria, scarlet-fever, measles, influenza, and croup were reported as less prevalent in March than in February.

TENNESSEE.—The principal diseases, named in the order of their greater prevalence, in the State for the month of March were : Pneumonia, bronchitis, tonsillitis, malarial-fever, consumption, rheumatism, and dysentery.

Chattanooga,	white	8.88 ;	colored,	24.91 :	14.10
Clarksville,	"	2.40 ;	"	20.00 :	9.00
Knoxville,	"	17.63 ;	"	30.83 :	20.31
Memphis,	"	20.42 ;	"	22.26 :	21.26
Nashville,	"	17.59 ;	"	29.08 :	21.87

THE QUARANTINE SERVICE ON THE ST. LAWRENCE, as reported upon for the year 1889 by Frederick Montizambert, M.D., Medical Superintendent, aptly illustrates the importance

of thorough competency as an essential pre-requisite to the successful administration of the office, but it furnishes no excuse for the continued negligence of the Government to provide a needful deep-water wharf, together with disinfecting appurtenances, which the superintendent has for several years urged, as essential for the protection of the public health, with the least possible obstruction to commerce, in the event of encountering a persistent epidemic under climatic conditions favorable to its introduction. Unfortunately, the legislative authorities of Canada are, with regard to the importance of timely and efficient means for the protection of the public health, much like those of our own country—never thoroughly convinced of the danger of an epidemic or of the importance of providing means against an epidemic invasion until it is upon them.

Dr. Montizambert makes complimentary reference to recent progress in protective measures at several American ports, consequent upon the cholera scare of two years ago, but there is reason to fear that here, as in Canada, with the abatement of the epidemic, the law-makers will cease to think that the best time to prepare for war is in time of peace.

Sanitary Condition of Melbourne: Report of Royal Commission appointed March, 1888, "To inquire into and report upon the sanitary condition of Melbourne and its suburbs; to what extent the existence of noxious trades and abattoirs injuriously affects the public health; whether it is necessary or desirable to remove those trades or abattoirs from their present sites, and, if so, to suggest other sites; whether any compensation should be paid for removal; to consider the various municipal systems of dealing with refuse matter; and, generally, to suggest such changes and improvements as may be deemed necessary, and such as may necessitate legislation," is an admirable example of painstaking inquiry with regard to the special subjects mentioned, together with a careful examination of the water-supply and its relation to the public health. A large number of the trades were found to be so situated and conducted—as they commonly are in the neighborhood of populous communities in this country—as to give rise to dangerous nuisance. These

recommendations were, shortly, such as American communities should profit by: "The trades should be classified, so that those which are necessarily offensive may be distinguished from those which are not offensive unless negligently conducted. The former should be removed from their present proximity to population. The latter should also be removed whenever they have a special tendency to cause direct offence by malodorous emanations or to pollute rivers by their drainage. . . . Compensation should be paid only for actual loss sustained in removal, and that the municipalities, being most directly interested, should pay compensation on this basis, and be empowered to raise the necessary funds. . . . Choice of new sites should be left to the trades, as well as all responsibility in connection with buildings, appliances, and methods. We further recommended that the inspection of all noxious trades should be more frequent and more thorough, that the forms of legal procedure for suppressing nuisances should be simplified, and that a third conviction for nuisance should be necessarily followed by loss of license in addition to the ordinary penalties. We also suggested certain modes in which the offence now caused during the transit of refuse matters to the trades might be mitigated."

Abattoirs were also found to be, as they commonly are in American cities, the source of grave nuisances. As a rule, the sites are bad, the arrangements for the approach and keeping of stock for slaughter defective, and the accommodation insufficient; the drainage and the mode of disposal of offal unsatisfactory and general cleanliness neglected; in some instances of great intensity fraught with river pollution and other conditions imminently dangerous to health. Conditions were recommended consistent with the protection of the public health, and closing all such establishments as neglected them. The inquiry with regard to refuse appears to have been limited to such as could be disposed of by perfecting the sewerage.

The remainder and much the larger part of the report is devoted to an examination of the water-supply and its relation to typhoid-fever. All sources of possible pollution were inquired into and expert analysts employed, followed by such recommendations as are well calculated to effect thoroughly protective measures hereafter.

LITERARY NOTICES.

FOOD IN HEALTH AND DISEASE. By I. BURNEY YEO, M.D., F.R.C.P., Professor of Clinical Therapeutics in King's College, London, and Physician to King's College Hospital. 12mo, pp. 591. Philadelphia: Lea Brothers & Co.

This new edition of the most complete and useful manual for the housekeeper, physician and nurse who would possess the best practical knowledge on the subject, doubtless will, as it certainly ought to, find a hearty welcome. Moreover, it comprises the food of soldiers and the dietaries of armies, prisons, and hospitals; points out common defects and suggests improvements.

The qualities and quantities of food suited to different periods of life, from infancy to old age; food suited to different avocations, and for the sick, with reference to particular diseases; artificial digestive agents, stimulants, and condiments—all treated from a strictly scientific standpoint, based upon large personal experience and the best practical results deduced from contemporary observers.

Taken altogether, it is the most complete and the best practical guide to dietetics that we know of.

WOOD'S MEDICAL AND SURGICAL MONOGRAPHS. April number contains: The Human Foot—Its Form and Structure, Functions and Clothing, by Thomas E. Ellis, M.R.C.S.; Modern Cremation—Its History and Practice, by Sir H. Thompson, F.R.C.S.; Aphasia—a Contribution to the Subject of the Dissolution of Speech from Cerebral Disease, by James Ross, M.D., L.L.D.

It is needless to say that these contributions are of interest to all medical practitioners. That on the human foot is fully illustrated, showing the anatomy of the foot and the evils of distortion. It also comprises the mechanics of foot clothing—shows how the foot should be measured in order to obtain the best fit, and a foot-stand or pedestal adapted to the purpose, and the proper shape for lasts. Possibly by the aid of physicians the suggestions may be made practicable.

Sir Henry Thompson's paper is a summary of the progress made in both sentiment and practice with regard to cremation as a sanitary measure generally in addition to its recognized necessity under particular circumstances. The paper on Aphasia is a summary of a number of cases treated together with a general review of the subject, its morbid anatomy and physiology, and bibliography.

THE HUMBOLDT LIBRARY. New York: Humboldt Publishing Co., 28 Lafayette Place. *Modern Science and Modern Thought.* Parts I. and II. By S. Laing. Prices 30 and 15 cents.

Electric Light and the Storing of Electrical Energy; illustrated. By Gerald Molloy, D.D., D.Sc. Price, Part I., 30 cents; Part II., 15 cents. Price 15 cents.

The Modern Theory of Heat and the Sun as a Storehouse of Energy; illustrated. By Gerald Molloy, D.D., D.Sc. Price 15 cents.

Utilitarianism. By John Stuart Mill, author of "A System of Logic," "Principles of Political Economy," "On Liberty," etc. Price 15 cents.

Upon the Origin of Alpine and Italian Lakes; and the Glazial Erosion. By Sir A. C. Ramsay, F.R.S., etc.; Sir John Ball, M.R.I.A., F.L.S., etc.; Sir Roderic I. Murchison, F.R.S., D.C.L., etc.; Professor B. Studer, of Berne; Professor A. Favre, of Geneva; Edward Whymper; Professor J. W. Spencer, Ph.D., F.G.S. With Introduction and Notes upon the American Lakes by F. W. Spencer. In two parts—Part I. Price 30 cents.

These are *brochures* of about one hundred pages each, containing the cream of the subjects respectively of which they treat. To the scientific reader generally, devoted as he may be to the special pursuit of one branch of science, they are eminently useful as summaries of collateral or contemporary knowledge on other subjects; while to him whose pursuit is herein especially summarized they are no less valuable by reason of the conciseness with which the subject is presented. Indeed, scientific readers generally, no matter what their particular sphere, will find in these and like publications by the Humboldt Publishing Company much to gratify their taste and promote their knowledge.

PROCEEDINGS OF THE DEPARTMENT OF SUPERINTENDENCE OF THE NATIONAL EDUCATIONAL ASSOCIATION AT THE MEETING IN WASHINGTON, MARCH 6TH–8TH, 1889. Circular of Information, No. 2, 1889. Pamphlet, pp. 300. Washington : Government Printing Office.

The subjects presented and discussed at this meeting, as published in the pamphlet before us, are abundantly significant of the progressive character of the Association in grappling with the most advanced thought in the promotion of education in its most comprehensive sense. Composed, as the Association is well known to be, of the foremost practical educators in the country, it is gratifying to observe the avidity with which they seize upon and apply the philosophy of education to practical work. Training and Teachers, Psychology in its Relation to Pedagogy, City Training and Practice Schools, Manual Training, Relation of Manual Training to Body and Mind, Psychology of Manual Training, To what Extent and How can Manual Training be Introduced into Ungraded Schools? Mechanic Arts High Schools : these headings fairly indicate the scope of the essays and discussions, with which all school officers and teachers would do well to make themselves acquainted.

THE VENTILATION OF BUILDINGS. By ALFRED R. WOLFF, M.E., Consulting Engineer, Member American Society of Mechanical Engineers, etc. New York : 315 Potter Building. Price 25 cents.

A *brochure* of thirty-two pages, comprising a good deal of useful information on the variable composition of the atmosphere in confined places and the proper means for maintaining it at a healthful standard during all weathers.

THE SEWER GAS QUESTION : An analysis and illustrated comparison of the several methods and means of establishing and maintaining the seals of sewer-gas traps. By E. S. MCCLELLAN, M.D. New York : DuBois Manufacturing Co.

An instructive *brochure* of sixteen pages, giving a lucid description of the various kinds of water-seals or traps in common use, intended to prevent the access of sewer gas, and pointing out their defects in contrast with the advantages of the "Anti-Siphon Trap Vent" invented by the author.

ANNOUNCEMENTS.

TENTH INTERNATIONAL MEDICAL CONGRESS. To be held in Berlin, August 4th–9th. In a letter dated Berlin, Karlstrasse, 19, March 22d, Dr. Lassar, the Secretary-General of the Tenth International Congress, directs me to inform the Medical Profession of America that a programme of the Congress and other communications will be distributed two months before the meeting among *those who will have registered previously and received their Tickets of Membership.*

The latter can be obtained by sending application and five dollars to Dr. Bartels, Leipzigerstrasse, 75, Berlin, S. W. By so doing the members will save much crowding and time during the first days of the Congress.

For the American Committee of the Tenth International Medical Congress,

A. JACOBI, M.D.

New York, April 7, 1890.

THE AMERICAN CLIMATOLOGICAL ASSOCIATION: PROGRAMME FOR THE MEETING TO BE HELD AT DENVER, COL., TUESDAY AND WEDNESDAY, SEPTEMBER 2D AND 3D, 1890.

Excursion trains, at low excursion rates, from Chicago, and probably St. Louis, planned to arrive on morning of first day.

The sessions of the Association to include three days in Denver, one of which will be devoted wholly to Colorado subjects. A banquet will be given by the city of Denver to the Association.

Friday.—Complimentary excursion to Idaho Springs, around the Loop, stop at Idaho, and return to Denver over Union Pacific Road through Clear Creek Cañon.

Saturday.—Complimentary excursion over Denver and Rio Grande Road to Palmer Lake, Colorado Springs, and Manitou, and return to Denver after other excursions are through.

Sunday.—Remain at Manitou or go to top of Pike's Peak by new railroad, if then completed ; visit the doctors of Colorado Springs, etc.

Monday.—Either complimentary excursion over Midland Road to Manitou Park and Cascade, or to start on long excursion to Glenwood Springs by Midland Road, stop at Leadville, and perhaps go down in a deep mine, and return from Glenwood through the Grande Cañon of the Grande River, and the Cañon of the Arkansas River, by the Rio Grande Road, to Denver, all of which will take two or three days.

. These excursions are complimentary, except the one to Glenwood Springs and return, for which the fare will not exceed ten dollars. The excursions from Chicago and St. Louis will be to Denver and return to the same cities at a low rate yet to be fixed.

J. B. WALKER, M.D., Secretary,
1617 Green St., Philadelphia.

A NEW MEDICAL REGISTER DIRECTORY AND INTELLIGENCER.

Medical Profession of the States of New York, Ohio, Illinois, Indiana, and Iowa :

The undersigned request the members of the Medical Profession in the above-named States to forward, at their earliest convenience, the following points : Name in full ; School of Graduation and Year ; Post-office Address, and State.

This will be used in the pages of the " Medical Register Directory and Intelligencer," Dr. William B. Atkinson, Editor. A copy of the book, printed on good paper, nicely bound, will be forwarded to each Physician (whose name appears in its pages) without charge.

The matter in preparation for it is of such value to the profession that every one who receives a copy will be sure to keep it at hand for constant reference. Its list of National and Local Medical Organizations and Post-office Addresses of Physicians will be complete to date of issue, besides other valuable information.

Yours very truly,
GEORGE KEIL, Publisher,
1214 Filbert St., Philadelphia.

MEDICAL EXCERPT.

THE CHANCES FOR GETTING DRUGS OF GOOD QUALITY ON PRESCRIPTION, according to the report of the New York Analyst of Drugs, is 43.8 per cent ; fair, 17.4 ; inferior, 26 ; not as called for, 11.6 ; excessive strength, 1.2.

CHRONIC SYPHILITIC SALIVATION.—A. W. Furber, M.D., L.R.C.S. and L.D.S., says : "I have for a long time had a gentleman patient under my care for disease of the teeth, and although my operations progressed favorably, I had many difficulties to contend with. The whole of my patient's teeth appeared to have a syphilitic taint, and with increased flow of saliva, amounting to chronic salivation. These were not the only troubles I had to surmount ; but that which retarded my work most was the repeated recurrence of syphilitic ulcers of the sulcus and gums generally, which, though not painful to my patient, was still a source of considerable discomfort, and militated greatly against the success of my operations. *Iodia* having come under my notice, I was inclined to give it a trial, and with the addition of a small proportion of liq. hydrarg. bi-chlor., taken daily before meals for a time—also used occasionally as a mouth wash—the salivation became normal, the mucous membrane assumed a more healthy state, and the teeth generally looked like coming back to their original color.

THE TREATMENT OF HEREDITARY SYPHILIS BY THE HYPODERMIC METHOD.—I was the first to attempt the hypodermic administration of the following substances in the treatment of hereditary syphilis : calomel, red oxide of mercury, gray oil, and the salicylate of mercury.

The vehicle used for these agents was liquid vaseline. They were administered in doses of from 3 to 5 centigrammes (gr. $\frac{1}{2}$ to $\frac{3}{4}$)—that is, the calomel, the red oxide, and the salicylate ; the gray oil was used in the proportion of from $\frac{1}{2}$ to 1 cubic centimetre (℥ viiss–xv). This last was better tolerated than

all the others, being almost painless at the time of injection as well as afterward.

The results did not quite equal the anticipations—that is to say, although beneficial, the hypodermic injections do not seem to bring about a complete cure as rapidly as one would be inclined to think in the beginning, although administered at very short intervals (four to ten days). No toxic symptoms, however, were observed.

In a general way, this method, I consider, is less active than that of friction with Neapolitan ointment (ungt. hydrarg); at least, this is what I have observed after repeated trials.—Dr. Moncorvo : *Satellite for February*, 1890.

LANOLIN.—The purified wool-fat consists essentially of the *esters* of various fat acids with cholesterin (chole-stearin). It is wholly indifferent to solutions of salts, of which it is capable of absorbing and retaining almost double its own weight. At ordinary temperatures it is not attacked either by acids or aqueous alkaline solutions ; it is, moreover, absorbed by the skin much more quickly and more completely than any other fatty substance known. To these qualities lanolin owes its extensive use in medicine as an ointment base. As hitherto brought to market it is *hydrated*—that is to say, mixed with 25 per cent of water. This admixture has the sole purpose of giving the lanolin a lighter color.

The Anhydrous Lanolin possesses the same desirable qualities as the hydrated lanolin. It is of a light-brown color, of unguentous consistency, and of absolutely neutral reaction. Its melting-point is about 45° C. (113 F.) ; it is clearly soluble in ether ; and it yields homogeneous mixtures with aqueous and with alcoholic liquids, and with fatty and ethereal oils.

It does not become rancid, and will therefore keep for an unlimited time. Hence it is the only really eligible ointment-base for hot climates.

It is applied to the same uses in pharmaceutic practice as the hydrated article is. In many instances, however, only the anhydrous article can be used to advantage. Such are : the preparation of plasters (which are now largely made with lanolin), or of mercurial lanolin ointment (*lanolinum hydrargyri*), etc.—inasmuch as, for using hydrated lanolin in such cases,

the water contained therein would first have to be removed by heat. Especially, however, is the use of anhydrous lanolin indicated when solutions of salts or extracts in large proportions are to be incorporated with a fatty substance.

When large proportions of powdered medicaments are to be mixed directly with anhydrous lanolin (without the intervention of water), it is advisable to give it an admixture of 30 per cent of olive oil ; or, preferably still, of vaseline. Such a mixture forms an excellent ointment base, which is very easily absorbed by the skin.—*Merck's Bulletin for April*, 1890.

ANTIPYRINE has been recommended in parturition and in other puerperal conditions, by many well-known authors, as a powerful agent in diminishing the pains of labor, and has been as strongly denounced by others. Its supporters urge that the practitioner has in it a powerful means of mitigating, at least, the pain which accompanies uterine contraction ; they recommend its use in all stages of labor, and advance, in support of their cause, many remarkable cases in which it has been successfully employed. On the other hand, its opponents believe that it is a dangerous remedy and should never be used in such cases by the physician, because its advantages are inconsiderable when compared with the disastrous consequences that might result to the patient. Both of these opinions are exaggerated, and in our judgment, antipyrine should not be given in all cases, nor should it be entirely rejected. Pinzani, after a long, careful, and impartial series of observations on this important matter, has published the results, which may be summed up as follows :

1. Given in therapeutic doses during labor, antipyrine exerts a depressing action on the uterine contractions.

2. This influence begins about half an hour after its administration, and is at its height at the end of an hour or an hour and a half after the injection has been given.

3. If given by the mouth the action is much slower.

4. The action of antipyrine is more intense in proportion as labor is less advanced and as the dose is larger ; and

5. In cases of labor, even in therapeutic doses it exerts a marked effect in diminishing the uterine contractions and may lead to very fatal results.

On the other hand, it has the power to diminish and even to entirely suppress pain during labor.

From these observations, antipyrine appears to be a dangerous agent in labor, except in some special conditions, among which may be mentioned spasmodic contractions of the neck, the premature rupture of the membranes, and in all complicated cases in which the pains are abnormally severe during labor.—*Gaceta Sanitaria de Barcelona.* *T. P. C.*

DYSENTERY has been successfully treated recently with injections of naphthaline by Rudionoff, in four cases. A dose of oil is followed by two injections of naphthaline, one in the morning and one at night. He gives about a grain and a half in two ounces of a vegetable decoction, diluted with an equal quantity of water, for a child. About nine grains to four ounces of decoction, similarly diluted, for an adult. Generally, after the second injection the condition is sufficiently improved to admit dietetic treatment. It is rarely necessary to repeat the naphthaline injection.—*Nouveaux Remèdes.* *T. P. C.*

ENCEPHALOCELE SUCCESSFULLY REMOVED.—The *Gazette Hebdomadaire* reports a case presented to the French Academy by M. Berger, in which he had excellent results from an operation for the extirpation of an occipital encephalocele, which involved a small portion of the brain substance and of the encephalon. The tumor was resected to the base of the pedicle. Immediate reunion was effected by means of strips from the cutaneous surface.—*T. P. C.*

THE USE OF SANDAL OIL.—A paper in the *Wiener Medizinische Blätter*, for February 13th, 1890, calls attention to the fact that the efficacy of specimens of sandal oil is largely dependent upon the origin of the oil, whether obtained from the sandal-wood from Zanzibar, Java or Australia. The Chinese appear to have been the first to recognize the properties of sandal oil in arresting gonorrhœa, and for a long time they have refused to make use of any specimens except those derived from sandal-wood from Mysore ; the Hindus likewise use the oil of the wood obtained from this locality, and a number of papers have recently been published which seem

to indicate that the antiblenorrhœic properties of the oil from this source is especially marked. Dr. Handerson, as quoted by the *Wiener Medizinische Blätter*, has used oil from this source and has obtained success where copaiba balsam and cubebs were perfectly inefficacious. Dr. Durand has also obtained success from the oil of sandal-wood, no unfavorable after effects appearing upon the digestible tract. Dr. Candmont regards the oil of sandal from Mysore as the most active remedy in acute inflammation of the bladder, and states that he has succeeded in curing acute cases of gonorrhœa in three days. Gipoulon also publishes notes of cases of acute nephritis, of congestion of the kidneys with consecutive hæmaturia, relieved by doses of sandal oil ; while finally Posner, in an address before the Medical Society of Berlin, called attention to the good effects which he had obtained from the use of sandal oil in the treatment of chronic gonorrhœa. Nevertheless in all instances the results obtained were in proportion to the purity of the preparation. It may be given in doses of about 3 drops in capsules in acute gonorrhœa, eight to twelve being given in a day, though in other affections three to six capsules would be sufficient. It is worthy of note that treatment should not stop immediately after the cessation of the discharge, but should be continued for some time subsequently. —*Therapeutic Gazette.*

Dyspeptic Troubles during Infancy. — Dyspeptic troubles present themselves with great frequency among children in Brazil. Besides the alimentary causes, the high temperature of the tropical zone during the long summer season, producing profuse diaphoresis, exerts a powerful influence upon the production of digestive disorders.

In infants above the age of two years, gastro-intestinal troubles are accompanied most frequently with dilatation of the stomach. From the time of birth until the end of the second year gastric insufficiency is almost invariably due to a deficiency or an absence of the free acid of the gastric juice.— Dr. Moncorvo : *Satellite for February*, 1890.

THE SANITARIAN.

JUNE, 1890.

NUMBER 247.

THE PROGRESS OF NATIONAL SANITATION IN THE UNITED STATES.

ABSTRACT OF THE ADDRESS OF E. M. MOORE, M.D., PRESIDENT OF THE AMERICAN MEDICAL ASSOCIATION, DELIVERED AT NASHVILLE, TENN., MAY 20TH, 1890.

THE tearing off the shackles that impeded commerce and human movement in passed time is due to medical science as applied to hygiene, and this long before the amazing discoveries in bacteriology of to-day, which have given a scientific demonstration of the correctness of methods already formulated, the result of experience and observation.

The history of legislation confirms these views, and yet its present status is full of encouragement. I have studied the work of Congress as shown in the laws from its inception to the present time—I must confess not a very laborious undertaking. The first Act passed by Congress with reference to health matters was in 1796, February 26th. It directed the President of the United States to assist the State Government in the execution of the State laws upon the subject of quarantine by his commands to all officers of ports on the coast and commanders of revenue cutters. This short Act was repealed by another and more comprehensive one passed February 26th, 1799. This Act relieved the President of any direct attention to matters of quarantine, by placing its care in the hands of the Secretary of the Treasury. This was obviously done because the question of revenue was involved in unloading and disinfecting ships. The Act, however, first reaffirms

the relations of the United States Government to that of the States :

" And the said Secretary may be, and he is hereby authorized, when in conformity to such quarantine and health laws shall require it, and in respect to vessels which shall be subject thereto, to prolong the term limited for the entry of the same and the report or entry of the cargoes, and to vary or dispense with any other regulations applicable to such report or entry. Provided that nothing herein shall enable any State to collect a duty of tonnage or import without the consent of the Congress of the United States thereto. And provided that no part of the cargo of any vessel shall in any case be taken out or unladen therefrom otherwise than by law allowed or according to the regulations hereinafter established.

Section 2 of the Act provides for the care of the vessel and the cargo when the health laws declare the necessity of unloading and removal to some place other than usual.

All this to be under the care of the Secretary of the Treasury, who exercises complete control of said cargoes until the revenues accruing have been paid, and the health authorities have released them.

Section 3 directs the Secretary of the Treasury to provide proper storehouses at proper sites for the care of the property according to the requirements of the health laws of the State, and at such convenient place or places therein as the safety of the public revenue may demand.

Section 4 provides for the safety of the officers connected with the revenue service, by allowing them to remove their offices to a safer position if an epidemic should prevail.

Section 5 provides for the adjournment of any United States court, and also for the removal of prisoners to another place of confinement at the expense of the United States during an epidemic.

Section 6 gives power to the President of the United States to remove any or all public officers if necessary.

Thus early was initiated a policy which has prevailed to the present time and which has been watched with great care and jealousy. The rights of a State have been asserted and maintained with the endorsement of the highest tribunal, not without some friction, the natural treatment of our dual Govern-

ment. No further legislation appears on the statute books until 1832, when a cautious expenditure is made to aid in enforcing the law by providing for more revenue cutters if necessary, but the force of the Act terminated within a year. From this time there is complete silence on health legislation until 1844, when an Act was passed providing for a special building at Lazaretto Point, for the purpose of quarantine. But shortly after this the country was visited by an epidemic of cholera. The previous one occurring in 1832, and far more severe, which struck fear into the heart of the nation, depopulating cities, was left to the management of the local authorities. No health organization worthy the name existed at any point. Indeed the natural guardians of the people, the members of the medical profession, were appalled and misdirected by erroneous theories of the disease. Two more epidemics supervened, and the transmission of cholera by persons to localities was no longer to be questioned. A vague atmospheric cause that no one could escape did not explain the phenomena of the disease. Accordingly we find the nation becoming aroused, and on May 26th, 1866, a joint resolution was passed by Congress which declares "that the Secretary of the Treasury be and he is hereby, authorized to make and carry into effect such order and regulations of quarantine as in his opinion may be deemed necessary and proper to aid State or municipal authorities to guard against the introduction of cholera into the ports of the United States. And the Secretary of the Treasury is further authorized to direct the revenue officers and the officers commanding revenue cutters to aid in the execution of such quarantine, and the execution of the health laws of the States respectively, in such a manner as may seem to him necessary. And such an amount of money as may be necessary to carry into effect this joint resolution, is hereby appropriated out of any money in the Treasury not otherwise appropriated; provided, the authority hereby granted shall expire on the first Monday of January, Anno Domini 1867."

Here again we have the Secretary of the Treasury circumscribed in his action by the limitation of time, and that a short one. Special attention in health matters is again relaxed for ten years, the ordinary machinery of government being

entrusted simply with the duties of quarantine, but in 1876 attention to the wants of the District of Columbia was given by an Act that provides for the salaries of the health officer and his assistants and allows ten thousand dollars in the event of an epidemic occurring. During the next year there were further modifications and a larger sum of money granted. From this time forward appropriations for the District are made yearly and in varying amounts.

Another great step in the movement of hygiene was an Act passed April, 1878, directing the Surgeon-General of the Marine-Hospital Service to make rules for the consuls in foreign ports with reference to certificates declaring the condition of the vessels and cargoes bound for ports in the United States. Then follows an Act showing further attention to details by changing the organization of the health board of the District of Columbia, it being abolished, and its powers transferred to the Commissioners of the District, the salary of the health officer being fixed at three thousand dollars. But before the close of the year another great movement in advance was made in legislation by an appropriation for paying the necessary expenses incurred in investigating the origin and causes of epidemic diseases in the United States. But in the meantime another great movement in the study of hygiene had been effected by the organization of State boards of health. The local boards existed with ample powers, but total neglect of duties. In the large cities, however, there were able men whose whole time was given to the work and sufficiently compensated, to bring the attention of the communities they lived in to the vast defect of municipal life.

Knowledge was expanding, and that most remarkable and valuable of all the engines for the promotion of hygiene, the State board of health, came into existence. This was not without great labor and heart-sickening delay. The best informed could see the great good, but the watchful conservative was stirred to the utmost, and regarded with horror the vast powers which the health organization must exercise directly or indirectly.

It has ever been difficult to make the citizen, in the enjoyment of the great freedom of motion of which the English and American people are so jealous, to submit to military control

in time of peace, and a control which reaches into his special domain, his conventional castle. But the local boards in the smaller communities were ever asleep at their posts until some fearful invasion of small-pox roused them to action. Then they, perhaps for the first time, studied the statutes of their State government to learn that their power was military, and the citizen, pale with fear, submitted to the restraint necessary for his safety. Then, in the rural district, he would assist in stretching the fence across the road to enforce the necessary quarantine. But as soon as the great danger was passed he would lapse into freedom, and perhaps jeer at vaccination.

But the conditions for controlling the invasion of pestilence are those of military operation. Power must be autocratic—an enemy is to be resisted, pursued, destroyed. Our external defences must be constantly manned. Vigilance must never be relaxed. For the protection of society a military organization is in constant existence ; it may be a sleeping lion, but it is a lion still. Thus the cholera and yellow-fever must be met. The invading hordes are invisible, but they come like the genii of Oriental stories. Panic sometimes attacks the best disciplined armies in an unaccountable manner. But when pestilence strikes a city the boldest flee.

To the credit of our age, even the superstitious do not bow their heads to the mysterious ways of Providence, but rise to the effort to obey his laws. Science searches out the enemy and devises the attack. But the machinery of defence must be in constant order. To bring about this result the State board of health came into existence. As has already been said, the development of this body was slow.

The power conferred on it in different States has not been precisely the same. In most of them it has no power at all. They are merely advisory bodies. The power is to be exercised by the Governor of the State, who is expected to receive their instructions. Even at this time there are some States that have not erected this organization. But where once created they have remained. The jealousy of the military power has passed away, for it has not been used as a means of oppression, and the benefits flowing from it have been so great that not one board has been destroyed. They have furnished hygienists for the nation. They have brought the

local boards to the performance of their duties in a greater degree. I believe their life is secure, and great expectations may be entertained of their future usefulness. It is idle to suppose that the executive of any State has the knowledge which can direct him in the right path of action. This must be the outgrowth of science ever advancing. But nations are naturally fearful of professional dictation. This has been shown by the fear of military men in control of free States. The success of the State boards very naturally pointed to the erection of the National board. It seemed to those most familiar with their workings, that such an institution would fill the measure necessary for the wants of the nation. It was the reflex action of our governmental structure. It was suggested that a permanent organization should be representative of the State boards, and thus be in touch with the people. Such opinions were, however, speculative and looked to the future. When these views were agitated the scourge of pestilence was present. Action could not be delayed, and a board thought to be representative of large interests should be formed at once. But the Act itself provided for the future by calling on those supposed to be best able to make a competent selection. It was found that the plan at first adopted met the conditions required, and it was believed by those selected to judge to be the best one after its first year of trial.

On March 3d, 1879, an Act was passed to prevent the introduction of infectious or contagious diseases into the United States and establish a National Board of Health. This is such an important part of our history that I quote it entire.

Be it enacted, by the Senate and House of Representatives of the United States of America in Congress assembled, that there shall be established a National Board of Health to consist of seven members to be appointed by the President by and with the advice and consent of the Senate, not more than one of whom shall be appointed from any one State, whose compensation during the time when actually engaged in the performance of their duties under this Act, shall be ten dollars per diem each, and reasonable expenses, and of one medical officer of the Army, one medical officer of the Navy, one medical officer of the Marine-Hospital Service, and one officer from the Department of Justice, to be detailed by the Secretaries of the several departments, and the Attorney-General respectively, and the officers so detailed shall receive no com-

pensation. Said board shall meet in Washington within twenty days after the passage of this Act, and in Washington or elsewhere from time to time upon notice from the president of the board who is to be chosen by the members thereof or upon its own adjournment, and shall frame all rules and regulations authorized or required by this Act, and shall make or cause to be made such an examination and investigation at any place or places within the United States, or at a foreign port, as they may deem best to aid in the execution of this Act and the promotion of its objects.

Section 2. The duties of the National Board of Health shall be to obtain information upon matters affecting the public health, to advise the several departments of the Government, the executives of the several States, and the Commissioners of the District of Columbia, on all questions submitted by them, or whenever, in the opinion of the Board, such advice may tend to the preservation and improvement of the public health.

Section 3. That the Board of Health, with the assistance of the Academy of Science, which is hereby requested and directed to co-operate with it for that purpose, shall report to Congress at its next session a full statement of its transactions, together with a plan for a National public health organization, which plan shall be prepared after consultation with the principal sanitary organizations and the sanitarians of the several States of the United States, special attention being given to the subject of quarantine, both maritime and inland, and especially as to regulations which should be established between State and local systems of quarantine and a National quarantine system.

Section 4. The sum of fifty thousand dollars, or so much thereof as may be necessary, is hereby appropriated to pay the salaries and expenses of said Board, and to carry out the purposes of this Act.

In April of the same year $200,000 was appropriated for the construction of a refrigerating ship for the purpose of disinfecting ships and cargoes, but on June 22d of the same year it was found necessary to state the powers of the National Board of Health. This was done by an Act elaborately defining its functions. These it is unnecessary to recapitulate : the vital part of the Bill is contained in the third section, which directs the " National Board of Health to co-operate with State and municipal boards of health in the enforcement and execution of the rules and regulations as set forth, to prevent the introduction of contagious or infectious diseases into the

United States from foreign countries, and into one State from another, and at such ports and places within the United States where quarantine regulations exist, under the authority of the State, which in the opinion of the National Board are not sufficient to prevent the introduction of such diseases into the United States or into one State from another; the National Board of Health shall report the fact to the President of the United States, who shall, if in his judgment it is necessary and proper, order such board of health to make such additional rules and regulations as are necessary to prevent the introduction of such diseases into the United States from foreign countries or into one State from another, which, when so made and approved by the president, shall be promulgated by the National Board of Health and enforced by the sanitary authorities of the States where the State authorities will undertake to execute and enforce them; but if the State authorities shall fail or refuse to enforce such rules and regulations, the President may detail an officer or appoint a proper person for that purpose."

To carry out the functions imposed upon it, the sum of five hundred thousand dollars was appropriated. Thus it would seem that the National board was constructed upon the model of the State board by its being directed to report to the President instead of the Secretary of the Treasury.

The National Board of Health has a splendid record. Brought into being by the presence of an overwhelming calamity, with doubts and misgivings in regard to its real status and the fear that the Constitution would not justify its action, it achieved a success that was the most remarkable in the history of hygiene. It found Memphis a pest house, and initiated the measures that made it a healthy and flourishing city. It has seldom fallen to the lot of any organization to so instantly and completely justify its existence. The report of the National Board of Health is one of the most elaborate and able productions that has been put forth by any body of men as far as my reading goes. Although a decade has now passed by, a period of great movement in sanitary matters, it is fresh and readable.

This would be expected from the array of names making the report. It undertook the mastery of the whole subject of

sanitation, not merely the war against epidemic diseases. It undertook to detect the adulteration of foods and drugs. It investigated the subjects of sewerage and drainage and ventilation.

The most active and prominent of all the *dramatis personæ* among the functionaries of health under the direct rule of the National Government is the organization known as the Marine-Hospital Service. This was founded in 1798, as an insurance against the calamities of sickness on the part of the employés of the commercial marine of the country. The nature of a sailor's avocation places him at the mercy of strangers, when sickness comes upon him, and a provision against that terrible misfortune is one of primary necessity. The functions of this Service have been maintained and extended for a period nearly contemporaneous with the formation of our Government. One cannot read the list of the houses of refuge which are directly constructed and managed by this Service or indirectly obtained by employing through contract the use of hospitals under the care of others, without a strong feeling of admiration for the care with which the Service is administrated. At every point of our immense shore line there seems to be provision for the sailors' necessities. This Service was placed under the supervision of the Secretary of the Treasury. The collection of the custom dues was naturally the function of this Secretary. Thus was established a closer relation between this officer and the Marine-Hospital Service. There is certainly nothing in the organization of this Service which calls for its employment, for making rules for the conduct of quarantine. But the Secretary of the Treasury when charged with certain duties in this connection has upon him the necessity of employing agents competent to perform these duties.

He finds willing and competent agents at his hand in the functionaries of an institution organized for quite a different purpose, men whose education and training already fit them for the new duties imposed upon them. Their execution of those duties has commanded the confidence of Congress, which has added, from time to time, new ones to be performed by them. The sailor himself, the most exposed of all the citizens of the Republic to the dangers of epidemics, would naturally bring the professional man who had care of him into close con-

tact with and study of these diseases. Hence it is easy to understand how, as has been happily said, this department has, by a sort of evolution, become an important sub-department of the Government. The late Dr. John M. Woodworth took the most lively interest in this development, and contributed by his advice to the construction of rules and regulations bearing on the relations of our Government to others in the matter of quarantine.

As a specimen of such legislation we may note the following instructions :

To officers of the Customs Revenue, Medical Officers of the Marine-Hospital Service, and others whom it may concern :

The Act approved April 29th, 1878, entitled "An Act to prevent the introduction of contagious or infectious diseases into the United States," provides that no vessel coming from a foreign port or country where any contagious or infectious disease exists, nor any vessel conveying infected merchandise, shall enter any port of the United States or pass the boundary line between the United States and any foreign country, except in such manner as may be prescribed under said Act.

Attention has been called to the prevalence of a dangerous epidemic disease in Southern Russia, known as the plague, and its extremely virulent and contagious character, as manifested in the late outbreak, leaves no doubt that it is similar to, if not identical with the "plague" which devastated the Old World in past centuries.

Because, therefore, of the danger which attaches to rags, furs, etc., as carriers of infection, the following regulations are framed, under the direction of the Secretary of the Treasury, and subject to the approval of the President, for the protection of the health of the people of the United States against the danger referred to :

Until further orders, no vessel from any port of the Black Sea, or the Sea of Azof, conveying any rags, furs, skins, hair, feathers, boxed or bailed clothing or bedding, or any similar articles liable to convey infection, nor any vessel from any port of the Mediterranean or Red Seas having on board such articles coming from Southern Russia, shall enter any port of the United States until such articles shall have been removed from the vessel to open lighters, or to some isolated locality, and the vessel disinfected and thoroughly ventilated ; and the suspected articles shall be disinfected either by chemical agents and exposure to free currents of air, or by burning, as shall be determined in each case by the Surgeon-General of the Marine-Hospital Service.

The recognition of the rights of the States is found in the statement that "The certificate of the State or municipal quarantine officer of health may be accepted as satisfactory evidence of compliance with these regulations on the part of the vessel."

It is not my purpose to define in detail the action of the Marine-Hospital Service. But I may observe that the duties incident to quarantine have been increased and rendered more accurate as time has brought more knowledge. I might note the imposition upon the consuls at foreign ports of the duties of inspection and report upon the condition of the vessel, cargo, and passengers. The suggestion of the law requiring such action comes from the present Surgeon-General of the Marine-Hospital Service, and upon him was placed the duty of constructing the rules. When the National Board of Health came into existence, the duties incident to the enforcement of quarantine and other matters outside of those that appertained to the organization of the Marine-Hospital Service were transferred to its jurisdiction. But it found these rules already at its hand, and they were accordingly adopted. To the active energy of Dr. J. B. Hamilton we owe very largely the evolution of good methods in dealing with the matters of quarantine. One has only to read the circulars put forth to the officers scattered along our enormous coast line and those addressed to our consuls to recognize the careful scrutiny he has made of the situation. It is impossible in the hour at my disposal to quote from these circulars. I could only cite one as a specimen of many. But I cannot pass away from what I should say of the Service without calling attention to the land quarantine, which may be considered as a new feature of the work. During periods of panic caused by epidemics, the first movement is flight from the suspected. But when the fugitive draws nigh an uninfected region, he is warned off at the peril of his life, hence the natural origin of the shot-gun quarantine. Townships invaded by small-pox are at times thus treated. When yellow-fever fastened on a locality, such a place was at once brought under the shot-gun. This barbarous method affords no relief to the stricken, and is not only disastrous to life, but destructive to vast commercial interests.

To modify this, and yet give security to those beyond the seat of pestilence, was the purpose of the land quarantine.

To guard the unaffected and yet allow the exposed safe conduct when they would not infect others, was the basis of action. To carry out such a plan would of course annoy those that came under the order of such regulations as were necessary; but this would be true of any quarantine whatsoever. If properly ordered, the method is not the shot-gun policy, but a substitute for it. Refuge camps, as has been said by Dr. Hamilton, are no new invention, but a quarantine camp along an inland route which provides for the detention of those flying from districts in which they have been exposed to contagious diseases in order that disinfection may be practised upon their effects during the incubation of the disease, is a new movement in the evolution of the methods necessary to arrest epidemics. Such was Camp Perry.

When a case of yellow-fever appeared among the detained, it was at once removed to the improvised hospital. That loud complaints should be made of this land quarantine was to be expected, but time justified the plan, for in the end it was found that no place became infected by those who were filtered through its alembic. Success must be the test. Applied science must make the method. Such a place was Camp Perry. Placed almost on the line that separates Georgia from Florida, it was prepared to execute one of the recognized functions of the National Government in the regulation of commerce between the States, which is not merely the transportation of goods over a line. It takes in the relations of men. One cannot read the description by Dr. Hutton, in the Annual Report of the Marine-Hospital Service, without being convinced of the excellent arrangement of the extemporized building. A little confusion at first was soon replaced by order and military regularity. As before remarked, this scores another step in the rapid progress of development going on in sanitary matters.

There is another field of sanitary action that should be noticed in this place.

In the year 1884 the consideration of animal diseases was transferred from the care of the Secretary of the Treasury to the Commissioner of Agriculture. This change would seem

to be natural. One can hardly conceive of a more uncongenial combination than a bureau of finance and one of scientific investigation. As a result of this change, a bureau of animal industry was created for the study and management of contagious diseases in animals. About fifty years ago the disease known as pleuro-pneumonia appeared among cattle in this country, but it was confined to a few localities. But as the cattle industry assumed the enormous proportions that it has at the present time, the disease began to show itself in the West about ten years since.

If allowed to spread, it would be difficult to measure the injury to the material interests of the nation, taking no account of the sanitary question in its relations to human life. The activity of the Commissioner of Agriculture has been very successful in arresting the spread of the disease, especially in the West, by far the most important field for his labor. He has had more difficulty in dealing with the subject in and near the cities in the East, more jealousy of official interference, more numerous owners of small collections, rendering the evasion of the police regulations more easy. But the results are gratifying on the whole. Here we find our dual Government capable of executing admirable work, while it is evident that the State rights can ever be a check on unwarranted action. But the general Government is capable of protecting communicating States suffering from the unfriendly acts of their neighbors. The regulations of commerce at the border is a powerful engine of control in all these relations. A State refusing acquiescence in proper sanitary laws soon finds its interest impaired by the quarantine that can be placed on it.

Again, the States themselves have established quarantine against neighboring ones where there was known to be pleuro-pneumonia among their cattle, thus reducing their ability to find a market for those that were sound. The intervention of the general Government, by their inspection and disinfection, was sufficient to cause the withdrawal of this shot-gun policy.

The principle of co-operation with the State authorities was the one that became successful. The diseases, being epidemic, are a matter of concern for the whole nation.

We cannot escape the duty of destroying an invasion. If the attack is severe over any considerable surface of territory

it paralyzes all local effort by the ruin it brings upon so many individuals. If it were like the destruction by a tornado or conflagration, it would not call for legislative action. The remedy, if needed, would flow from benevolence. But it does not stop here. The whole are endangered. Political boundaries do not exist for it. The invasion must be resisted. In the year 1884 money was appropriated for the bureau of animal industry to investigate and arrest, as far as possible, the extension of pleuro-pneumonia. But this did not grant to the commission the privilege of purchasing the diseased animals and then destroying them. The law as first established did not authorize the slaughter of affected animals, but only gave the right to establish quarantine, such as might be necessary to prevent the spread of contagious diseases from one State or Territory to another. It was found impossible to maintain a sufficient quarantine under the law. The disease is one that often assumes a mild and chronic form, with symptoms so moderate as to make diagnosis uncertain, and thus cases would exist capable of conveying the infection. The experience of European nations had already settled the question of the only sure method of procedure. This consists in the slaughter not only of the diseased animals, but those herding with them. If there had been an exposure, there can be no assurance that one such, when removed to other associations, may not afterward have the disease developed. The continuance of the quarantine during the usual period of incubation is hardly a certain assurance of immunity. The exportation of animals to Great Britain was so restricted that no cattle, sheep, or swine could be sent from this country except for slaughter at the landing-place. Benefits of time after a voyage were thus cut off, to the great detriment of the trade.

The exportation of sheep declined from 108,652 in 1879, to 32,510 in 1884; and that of swine from 25,033 in 1879, to 4 in 1884. But the restrictions to commerce in animals were not confined to foreign lands. Our own States set bounds on the traffic. While it is impossible for any State to levy a tax or impose any form of custom duty or other methods of interfering with commerce, the health laws allow complete non-intercourse in the presence of epidemic diseases.

Quarantine can be set up even in the townships. The Commissioner of Agriculture has been able to happily supplant these absolute restrictions by better methods. Nothing, however, could be done efficiently without the consent of the States. In most of them the laws were imperfect. In the shadow of a great danger these were amended so as to cooperate with the National authorities. But it was found, as soon as an attempt was made to arrest a disease, that private efforts were sufficient to neutralize all efforts, unless a fund large enough to pay for all animals to be slaughtered was appropriated. This the State failed to do. Attempts have been made in localities to get money by subscription to destroy some herds from the owners of neighboring ones which were free from disease. But this failed. Congress was now asked for more money and the power to use it as the Commissioner thought best.

Accordingly, an Act was passed in 1866 placing $500,000 in the hands of the Commissioner, who might use "any part of this sum in the purchase and destruction of any diseased or exposed animals, and the quarantine of the same." Immediately after the Bill became a law, rules and regulations were drawn up and submitted to the Governors of States for their approval. Thirty-one States adopted these, and in the year 1887 the work was in full play. The magnitude of this work can be appreciated when it is learned that from August, 1886, to October 31st, 1887, the inspectors of the bureau carefully examined 15,387 herds containing 117,480 animals, in districts where the disease was supposed to exist. Among these were found 798 herds, containing 10,766 animals, of which 2235 were affected with pleuro-pneumonia. Besides these there were 2873 head of cattle in the distillery stables of Chicago, nearly one half of which were diseased. This work was nearly all done in the West. During the succeeding year the inspection was extended to the East, including the great cities of New York and Philadelphia. A more thorough agreement having been reached between the States and National authorities, there were inspected during the time between January 1st, 1888, and November 30th of the same year, 35,451 herds, containing 304,698 head of cattle. Of these 183,257 were tagged and registered upon the books of the office.

There have been 41,361 post-mortem examinations made, and 3380 carcasses were found to be affected with pleuro-pneumonia. The quarantine stations have been carefully guarded, and it is believed that no importation of diseased cattle has occurred. But there are many other diseases of a contagious character among other domestic animals. The most important, from which losses in money are to be counted in millions of dollars, are those of swine, notably those of hog cholera and the swine plague. In the study of these the laboratory work of the Department of Agriculture has been great and expensive.

The bacilli that are connected with these fatal diseases have been studied with great care. Accurate results have been obtained in consequence of the ability to use the pure cultures to produce the disease in animals previously healthy. Thus two distinct diseases have been diagnosticated: one affecting the bowels alone, the hog cholera, and the other having its chief seat in the lungs, and secondarily in the bowels. It has also been shown that the bacilli of hog cholera will retain its vitality in water for four months and in the soil for two or three. Such bacteriological researches reflect great credit upon the bureau. Its studies extend to other animals, but the sphere is more limited.

It must ever be borne in mind that the organization of State defences and the execution of the methods necessary to eradicate the causes of infective or contagious diseases are military in character. We use a common eupheuism when we call all these measures police regulations, but the proper name is war. We have an insidious and sanguinary foe to meet. The measures to be taken must be prompt and thorough. A health board may be a good council of war, but the executive officer is the important man. How important that he should be competent! But to this he must be trained.

The force to carry on the work of sanitation has a strict analogy with the structure of an army. The medical officers must have under them inspectors of various degrees of training, as well as men to fulfil still minor functions. All this has been happily indicated by the head of the Marine-Hospital Service. His plan must become the germ of the future management of the sanitary service. I do not apprehend difficulties to arise from political appointments. The methods

now used cannot well be ignored. Indeed, these appointments must have the character of commissions, as in other military formations. Along with such *personnel* will be developed the machinery of war. We do not need Krupp or dynamite guns. But we do need trains of cars which will carry the most elaborate arrangement for fumigation and disinfection, as well as dwellings for the detained, ready to be transported with all the conveniences of living

At the present time the Government is building expensive vessels, but not expensive in a military sense, arranged with apparatus for disinfecting the contents of a vessel along side of which it can be moored. The admirable Holt system furnishes the cue to all these measures.

Sanitarians at once recognized the duty of all governments to extirpate epidemic diseases in their endemic homes. But these are apt to be found among ignorant and shiftless people, often maintained by religious fanaticism.

Vast hordes of Hindoos are collected on the Ganges at special points to bathe in its sacred waters on a special day, and also to drink of them. The multitude encamped on its banks, awaiting the supreme moment of religious exaltation, defile the waters so as to render them admirably efficient for their devilish work. Beatification having been obtained, the wretched victims of superstition fly along every route, scattering the cholera over the world.

More than twenty years ago this writer, in a public address, insisted that the long arm of Europe should reach into the heart of Asia and compel these fanatics to cease consuming their own dirt. Surgeon-General Hamilton, in an excellent paper, has brought out the same thought with reference to the haunts of yellow-fever.

If a band of fillibusters should land on the remotest Florida Key, the American heart would throb with rage from Alaska to Eastport. Yet we are silent when invaded by the invisible hosts who will soon destroy more lives than will occur in the most sanguinary battles. A large number of facts bearing upon the subject of hygiene are passed by for want of time in their enumeration.

The Government has shown willingness to advance in the great work of hygiene when properly approached, but does

not readily take the initiative. I might cite many instances of this. I might detail the accounts of Dr. Sternberg's investigation of the application of attenuated yellow-fever virus, after Pasteur's method by Dr. Domingues Freire, of Rio Janeiro, whose scientific claims were so utterly demolished that you feel pity for the victim. I might speak of the international conference for promoting uniformity of action in matters of hygiene, marking a splendid advance in the application of science to practice showing that "all the world's akin." I might detail the doings of the convention of Montgomery, and mark the influence of the Public Health Association, and of many other things showing the grand movement of the day.

But besides the great matters of external quarantine which are necessary to the obstruction of epidemics, there is the necessity of regulations which have been but moderately attended to, and yet are of the greatest importance.

The contagiousness of diphtheria and scarlet-fever, and the known transmission of these terrible scourges by fomites has received but little attention. The disinfection of cars has not been systematically attempted, but calls for investigation and a general ruling. This matter alone will necessitate a large force of inspectors. It can hardly be done except by the National Government, which should stand guard at every State line, as well as on the outer border.

The vast questions relating to the adulteration of food should come under the same rule as other sanitary questions.

While this writer was a member of the State Board of Health of New York, it received notice of a ship having arrived from China, loaded with what the Celestials call "lie tea." It immediately took measures to have the pseudo-tea thrown into the harbor, but it was confronted with the question of jurisdiction. The owners soon became aware of its intentions, and before the machinery of law could be invoked the industrious drummers threaded the routes of commerce, and we had no "lie tea" to throw overboard.

There are also vast questions yet untouched involved in the prevention of malarial diseases. The drainage of swamps is a matter which will task the best judgment of scientists and engineers. States shrink from any consideration of the subject, appalled by its magnitude, nevertheless upon them the

work must essentially fall. But pestilential swamps cross State lines, and one State may be much injured by the action of its neighbor. The difficulties surrounding these questions are prospective, but their solution will be demanded as population grows more dense.

In all this I have presented to you nothing new. To many of you the facts to which I have alluded are far more familiar than to myself. But their recital was necessary to focus the attention upon the situation. The relations of our dual Government have become more clearly defined than formerly, as the necessity of action has arisen. The interference of the National Government with the States, in the exercise of their just rights, will always be resented, and in my judgment should be most jealously. But this does not absolve the National Government from the performance of paramount duties in the various relations thus far cited.

Can a National board of health execute the functions indicated? It found itself embarrassed almost at once by its size, and created an executive committee. If it undertakes to perform the duties necessary, it must organize a permanent force and be constantly in session, or divide its membership so that each one shall be the executive head of a drawer in a large bureau. This surely would be no gain over a bureau superintended by one man. The Secretary of the Treasury is that one man now. But the relation is an absurd one. In a village board of health would any one choose the banker as its head because of his trade? Has a financial functionary any conceivable relation to a scientific body, of a natural kind? The true solution of this vexed question should be found—as in the end it must be—by the appointment of a single man who will give his undivided attention to this great subject. He should be to his functionaries what the Secretary of War is to his. It is not essentially desirable that he should be a medical man. Probably it would be undesirable. Our Government in its concrete form represents the people, and the Secretary of War and Navy are not professional soldiers or sailors, and thus they stand between the purely professional organization and the people. My own observation has shown me that a layman on a State Board of Health is one of its most valuable members, rapidly coming into relation with the ideas of his

confrères and giving assurance to the community. Moreover, the expansion which an organized system would assume needs this position. As I have said, I do not fear political dangers. Indeed, I do not see that they would be other than those we incur at present. The members of the National Board of Health, drawn from civil life, might in time become subject to the baneful influence of political choice. But the Army and Navy are free from this in virtue of the commissions they hold. The medical men must be confirmed in their places by the same method. Experience has shown that the best talent can be thus secured. Surgeon-General Hamilton has developed this plan with eminent success. When a government can draw upon such men as Sternberg, and Billings, and Guiteras, it is independent of choice from civil life. The Department of Agriculture found the bureau of animal industry was altogether taken up with the consideration of animal diseases. It would seem to be cognate, but the natural outcome of such a bureau should be the improvement of animals and their financial relation to the country. The sanitary questions involved should be gathered into the same hands that wield the powers of government with reference to contagious diseases in human beings. This bureau has developed excellent scientific workers. The Marine-Hospital Service and the Army and Navy have their laboratories and pursue original investigations. The control of all should be under one head. It would thus become far more efficient. The time has come and now is when THE HEALTH MINISTER SHOULD BE APPOINTED.

I close my discourse as I began it, by saying that the profession, both in its aggregate character as represented by this body and by its individual members, should urge on the execution of this movement, the ultimate one in our Government. When this is done, this department will expand to the necessities of the case. There will be no dividing of the responsibility, and there will be constant watchfulness during the war which is inevitable. When this shall have been accomplished it will be found that of all the men chosen by the chief of our magnificent Government, to aid him in carrying on its functions, the one who will have the most arduous labors to perform and the most delicate functions to execute will be the SECRETARY OF SANITATION.—*Journal Am. Med. Association.*

WORK OF THE MARINE-HOSPITAL BUREAU.

ADDRESS OF JOHN B. HAMILTON, M.D., LL.D., SUPERVISING SURGEON-GENERAL OF THE MARINE-HOSPITAL SERVICE OF THE UNITED STATES, THE CHAIRMAN OF THE SECTION ON STATE MEDICINE.

GENTLEMEN: I congratulate you on this annual reunion, that we have met in a city famous for its beauty, its salubrity, its educational institutions, its boundless hospitality, its "Hermitage," and not least that we are here in the home of that veteran of sanitary science who so ably presided over the deliberations of this section last year, and whose presence among us to-day is at once an inspiration and a source of pleasure.*

In accordance with the time-honored custom, it becomes the duty of the Chairman of this section to give a short address, and I assure you that addressing so distinguished a body, largely composed as it is of medical gentlemen who make the business of public health their chief business in life, is a matter of no little anxiety.

First of all let me thank you for the honor conferred upon me by election of the Chairmanship of this section. But I esteem it less a personal compliment than as recognition of the great medical service of which I happen to be, at the present time, the commanding officer—a service, I may say, whose members are, to a man, enthusiasts on the subject of public hygiene, and whose labors I trust will reflect credit upon their country and their chosen profession. Owing to the peculiar relations which the Marine-Hospital Bureau bears to the public health in this country, it is perhaps fitting that I should refer somewhat to the operations of that Bureau during the past year, and briefly sketch what changes have taken place since our last meeting in Newport.

Largely through the favor and support of the American Medical Association, and especially of this section, Congress has strengthened the hands of the Bureau by enactments which

* J. Berrien Lindsley, M.D.

have come in what I may truly call its developmental stage, for in the very nature of things it is impossible that its development can ever be completed, for with equal pace with the general diffusion of knowledge and the advancement of sanitary science new problems arise for solution, and new factors of extension and for the prevention of disease are presented for consideration.

The work of the Marine-Hospital Bureau in public health matters during the year has been confined to increasing the facilities at the different quarantines for treatment of vessels; the publication of Weekly Abstract of Sanitary Reports, with which most of you are familiar, and the increasing of the facilities for laboratory work. There are two laboratories now fitted up with ample appliances for bacteriological work. One of them is intended for a general hygienic laboratory, and is at present located in New York. It is greatly desired that this laboratory shall be removed at no distant day to the National capital and placed in a suitable building, where its usefulness may be greatly increased, and its work conducted under the more immediate supervision of the Bureau. The other laboratory has been established at the Key West Quarantine Station on Tortugas Key. It is intended that the questions connected with the etiology of yellow-fever shall be assigned to this laboratory, while the one at New York is for general hygienic work. Special investigations have been conducted at the New York laboratory on the hot air treatment for pulmonary phthisis, a detailed account of which was published in the Abstract of Sanitary Reports for September 6th, 1889; on various sources of infection in surgical wards; on specimens that have been referred to the laboratory from different stations, and the careful investigations of the cases of malarial and enteric fevers occurring at the marine hospital at New York, for the purpose of establishing the presence of plasmodium malariæ in the blood and of the bacillus of Eberth in the spleen or intestinal canal. In the latter investigation Dr. Kinyoun gives the following conclusions:

1. Malarial and enteric fevers are not antagonistic to each other.

2. A differential diagnosis between the two diseases is sometimes impossible.

3. There exists a mixed form of infection which can be diagnosed by means of bacteriological and microscopical examination.

An interesting observation as to the therapeutical effect of cobra poison is now going on at the laboratory. The origin of this investigation is as follows :

A little over a year ago, Mr. Peroux, of Calcutta, wrote to the Bureau stating that the natives in India were in the habit of treating cholera in its commencement with minute doses of a substance which proved to be cobra poison and that treatment had seemed to be pretty generally successful. This statement was made with a request that the Government would investigate the matter with a view of ascertaining the action of cobra poison on the cholera bacillus. After some difficulty and the lapse of some time a considerable quantity of the poison was procured and is now being examined. The experiments are not completed, but Dr. Kinyoun has informed me that the cobra poison in a very minute quantity is a germicide of extremely high power, that it is fatal to the development of cholera germs. Control experiments are now going on, and he hopes to be able to make complete report on this subject by the close of the present fiscal year.

THE INTER-STATE QUARANTINE ACT.

The President signed the Inter-State Quarantine law March 28th, and with this law the general measures advocated for some time past are completed. The Act of April 29th, 1878, inaugurated the system of reports from our Consuls abroad, and prohibited the entry of infected ships. The Act of August 1st, 1888, established United States quarantines wherever the sanitary defences of our coast seemed incomplete, and the present law provides that when it shall appear to the satisfaction of the President that cholera, yellow-fever, small-pox or plague exists in any State or Territory, and there is danger of the spread of any of those diseases to any other State or Territory, then regulations for the prevention of its extension shall be framed by the Supervising Surgeon-General. When these regulations are approved by the Secretary of the Treasury and the President, they are binding upon the general public, and specifically upon officers, of the Government, common

carrier's agents, officers and employés. A severe penalty is prescribed for violation of the regulations so framed. Another feature of this new law is the fact that violations of any of the general quarantine laws of the United States are made punishable offences. It was a radical defect in the law of 1878 that no penalty was prescribed for the violation of its provisions, and in cases actually tried no fines could be imposed.

Taking the three acts as a whole, there is now authority for the exercise of governmental control whenever any extraordinary emergency shall require it ; and for the performance of the ordinary quarantine service and the collection of sanitary information the Marine-Hospital Bureau is greatly strengthened by the new act.*

But one opportunity has been had up to the present time for carrying into effect the provisions of this Act. The State Board of Tennessee having had it reported that an epidemic of small-pox was prevalent in an adjoining State, and that the measures for its control were not sufficiently strict, made application to the Bureau to cause such measures to be taken as would prevent its spread to their State ; but investigation proved that the original reports were groundless. Hence, no action was taken. It may be proper to state in this connection that in case more stringent measures had been deemed necessary the State Board of Health most interested would have been given the opportunity of conducting the campaign.

The United States has now assumed the duty of inspecting the immigrants bound for our shores, a duty heretofore imposed on the State authorities, and it will be possible to have a much better sanitary surveillance over them than heretofore. This step constitutes, in my judgment, a distinct advance in the sanitary defences of the country. The necessity of a stricter supervision of immigrants was never more manifest than now. The actual condition of Italy, for example, is well shown in the following statement.

Annual summary of all the *cases* of infectious disease reported by attending physicians in Italy in 1889. From an official report.†

* See preceding number of THE SANITARIAN, p. 455.—EDITOR.

† See Abstract of Sanitary Reports, May 16th, 1890.

Estimated Population.	Small-pox.	Measles.	Scarlet-fever.	Diph-theria.	Ty-phoid-fever.	Spotted Typhus-fever.	Puerper-al-fever.
30,565,188	39,730	133,700	30,916	28,839	55,502	2,246	7,588

EPIDEMIOLOGY.

No serious epidemic of yellow-fever or cholera or small-pox has occurred within the limits of the United States during the present fiscal year, although some isolated cases of yellow-fever have appeared at Key West. At the latter place it appears beyond doubt, from recent investigations by Sanitary Inspector Posey that, owing to the local conditions, the city of Key West is in danger of becoming a centre for the dissemination of yellow-fever. This is all the more deplorable from the fact that it appears from his report that this arises from lack of the plainest observance of hygienic rules. The use of cesspools within the city limits, bad water-supply, entire lack of drainage, general lack of municipal cleanliness, affording favorable conditions for the propagation of the hypothetical germ of yellow-fever. It is believed, however, that, as its condition is now well known not only in Florida, but throughout the United States, the local authorities will be stimulated up to the point of placing this city in a proper hygienic condition. No city in the Union is more favorably located by nature for a sanitarium than the city of Key West. The beautiful island is crowned by royal palms, bathed in sunshine, and fanned by the sea breezes and steady trade winds. In a region of perpetual summer, its atmosphere is always balmy. The island itself is a coral rock, on which but a small amount of alluvium is found, sufficiently high to insure good drainage. There is no reason why Key West should not be a terrestrial paradise if the inhabitants so willed it, and would only take the necessary steps to perfect its hygiene, rase its hovels, and build better dwellings.

A detailed account of the sanitary condition of Key West will be found in the Abstract of Sanitary Reports for March 14th, 1890.

INFLUENZA.

An epidemic most serious in its results, but singularly enough entirely free from the production of a panic, was the epidemic of influenza which swept over this country during the past fall and winter. Many persons acquainted with the history of previous epidemics of influenza were inclined to make light of it at first and to predict the most trifling consequences, but it was found that the mortality from pneumonia, from phthisis, from respiratory affections generally, was very much increased, and it soon became known as more destructive than those diseases apparently more dangerous, on account of these collateral effects mentioned. To the epidemiologist, the course of influenza, viewed in the light of modern bacteriology, seems one of the most wonderful phenomena of nature. That an epidemic having arisen in one of the most remote parts of the globe should suddenly in a few weeks extend itself over so vast a space is surely worthy of the most attentive study. Through the State Department I hope, at no distant day, to be able to ascertain in what part of the world this influenza first made its appearance, but as yet it has not been traced beyond its original appearance in St. Petersburg, Russia, in November, 1889. A statement has appeared, however, from Danish sources to the effect that the disease was in Iceland in May, 1889. This report however, has not been confirmed. The legation at St. Petersburg has been written to obtain from Russian sources an account of the origin of this epidemic. So far as is known, no inhabited country has escaped an attack of the disease, and although apparently originating in the North, yet the scorching sun of the tropics appeared to have no influence in arresting its progress. From the northern latitudes to the tropics, thence to the extreme south, westward to the Polynesian Island and the Indian Ocean, persons, and in some instances animals have been affected by the disease. As might have been expected, it proved much milder in the tropics than in the higher altitudes, but its origin is as yet unknown, and although a particular bacillus has been assigned as the potential factor in its causation, it is as yet unaccepted.

LA "NONA."

Another disease is reported in the public press to exist in Europe in circumscribed localities, under the name of nona,

and there is confirmation of it in medical journals, but none has been officially reported. It has been stated to be in this country, but the experience of the Bureau in the investigation of epidemics, thus unofficially reported, has been entirely negative. Many sensational reports are printed concerning alleged terrible epidemics, which, on investigation, turn out to be simple affections sufficiently well known, and entirely without the province of local, State, or National health officers. Dr. Braun, in the *Deutsche Medicinische Wochenschrift* of March 27th, 1890, describes the disease, the principal symptom of which is prolonged sleep. Pneumonia and meningitis occur simultaneously. All the cases reported have been fatal, and it is regarded as a combination of pneumonia and cerebro-spinal meningitis, perhaps due to the causes of influenza.

LEPROSY.

The American Public Health Association, at its meeting, last November, passed a resolution requesting that the National Government take some means to prevent the introduction of leprosy into the United States. It had been known for some time that leprosy was increasing, perhaps throughout the world, and this view would seem to obtain from the recent reports concerning its great increase in New Caledonia and other parts of the world where lepers, owing to increased facilities of transportation, find their way, and it was believed that the leprous settlements in the United States owe their origin to direct importations. While there exists no power in the National Government to seize a leper and confine him, there is ample power to prevent his coming within the limits of the United States. Under the Act of April 29th, 1878, and under the more recent Inter-State Commerce Act, it will be possible to restrict his transportation from one State to another, provided State Boards of Health shall desire to co-operate. Without their co-operation it would be impossible without an expense entirely out of proportion to the public necessity. On two occasions I have visited the leper hospital of San Lazaro, in Havana, and have become convinced that the true policy of the country should be the confinement of all lepers on a public reservation to be set apart for them. The Sisters in charge of the hospital of San Lazaro assured me

that no instance of transmission of the disease had been known, but the great number of lepers running at large in the island of Cuba shows that the disease is propagated in some manner; and when I discovered that in this hospital various articles of bric-à-brac, wearing apparel, and other things were manufactured for sale and distributed throughout the island, the means of its transmission did not seem far to seek. Moreover, these lepers in San Lazaro are not strictly confined to the hospital, such as are able to travel being allowed to go out on permit from time to time, and the discipline did not seem to me at all rigorous. In fact, the incarceration of a leper in this magnificent hospital seemed to be a guarantee that he was for the rest of his life to be provided for in comparative luxury. In my opinion, the confinement of the lepers on a public reservation large enough to give ample space for their segregation, the entire separation of the sexes, and to give them opportunity for outdoor agricultural pursuit, is the true solution of the problem of what we are to do with the lepers in this country. Under present regulations, no leper will be permitted to land in any vessel coming into the United States. The circular in which this regulation was formulated reads as follows:

CIRCULAR—REGULATION TO PREVENT THE INTRODUCTION OF LEPROSY.

1889.
Department No. 130.

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL, MARINE-HOSPITAL SERVICE,
WASHINGTON, D.C., December 23, 1889.

To Medical Officers of the Marine-Hospital Service, Collectors of Customs, and others concerned:

The National Quarantine Act, approved April 29th, 1878, entitled "An Act to prevent the introduction of contagious or infectious diseases," provides that no vessel or vehicle coming from any foreign port or country where any contagious or infectious disease exists, or any vessel or vehicle conveying persons or animals affected with any contagious disease, shall enter any port of the United States, or cross the boundary line between the United States and any foreign country, except in such manner as may be prescribed.

Attention is now directed to the increased prevalence of the contagious disease known as leprosy in several foreign countries, and the danger of its increase in the United States through the immigration of persons affected with leprosy, and

by direction of the Secretary of the Treasury the following regulation is framed under authority of the foregoing Act, subject to the approval of the President, to protect the people of the United States from the introduction of leprosy :

1. Until further orders, no vessel shall be admitted to entry by any officer of the customs until the master, owner, or authorized agent of the vessel shall produce a certificate from the health officer or quarantine officer at the port of entry, or nearest United States quarantine officer, that no person affected with leprosy was on board the said vessel when admitted to free pratique, or in case a leper was found on board such vessel, that he or she with his baggage has been removed from the vessel and detained at the quarantine station.

2. Medical officers in command of United States quarantines are hereby instructed to detain any person affected with leprosy found on board any vessel, but such officer will permit the departure on outgoing vessels of persons detained at quarantine in pursuance of this regulation, provided such vessel shall be bound to the foreign country from which the said leper shall have last sailed.

JOHN B. HAMILTON,
Supervising Surgeon-General, Marine-Hospital Service.
Approved :
WILLIAM WINDOM, *Secretary.*
Approved :
BENJAMIN HARRISON.

Although perhaps only slightly contagious, it is clear to my mind that leprosy is inoculable, and for that reason dangerous ; at any rate, it is evident that the country will not suffer if leprous immigrants are denied admission. Since the issuance of the circular one leper has been stopped by the Boston quarantine authorities. While this address was being written, a report of a leper at Evansville, Ind., was received. The origin of this case has not yet been determined. The patient is a steamboat man, a native of the United States.

INTERNATIONAL RESPONSIBILITY.

At the last meeting of this section the writer introduced a resolution which had previously been formulated at the Montgomery Quarantine Conference of 1889, in regard to international responsibility. This resolution, it will be remembered, was unanimously adopted by the section, referred to the association, and by the association adopted. It for the first time distinctly announced the doctrine that a nation was responsi-

ble to other nations for maintaining a plague centre in its own territory. The paper which I read in support of the resolution, in this section, has been reproduced in France, and read with approval to the Société Française d'Hygiene, of Paris, by the distinguished Secretary-General, Dr. De Pietra-Santa. I subsequently had the opportunity of further elaborating this as a principle of international law, and presenting it to the Honorable the Secretary of State for transmission to the Committee on Quarantine of the International American Conference. It does not appear, however, to have borne fruit in that body, for the Committee on Sanitary Regulations reported to the Congress the following recommendations, which it will be seen have no reference to this proposition :

The International American Conference, considering :

That taking the existing state of the relations between the nations of America, it is as practicable as it is advisable, for the promotion of these relations, to establish perfect accord with respect to sanitary regulations ;

That the greater part of the ports of South America on the Atlantic are guided and governed by the decisions of the International Sanitary Convention of Rio Janeiro, of 1887 ;

That although it does not appear that the plans of the Sanitary Congress of Lima, of 1889, have passed into the category of international compacts, it is to be hoped that they will be accepted by the governments that participated in the said congress, because those plans were discussed and approved by medical men of acknowledged ability ;

That the Sanitary Convention of Rio Janeiro, of 1887, and the draught of the Congress of Lima, of 1889, agree in their essential provisions to such an extent that it may be said they constitute one set of rules and regulations ;

That if these were duly observed in all America, they would prevent, under any circumstances, the conflict which usually arises between the obligation to care for the public health and the principle of freedom of communication between countries ;

That the nations of Central and North America were not represented either in the Sanitary Convention of Rio Janeiro or the Congress of Lima ; but that they might easily accept and apply to their respective ports on both oceans the sanitary regulations before cited :

Recommends to the nations represented in this conference the adoption of the provisions of the International Sanitary Convention of Rio Janeiro, 1887, or the draft of the Sanitary Convention of the Congress of Lima, of 1889.

It appears, on careful examination, that the plan of an International Sanitary Convention, which was formulated by the American Sanitary Congress of Lima, in 1888, followed very closely the articles laid down in the International Sanitary Conference of Rome, in 1885. It, however, laid down a more detailed plan of quarantine, and it must be admitted that the plan of quarantine there named is admirable in many respects. It does not differ from the plans of quarantine at present adopted. It obliges each country to establish a maritime sanitary service, and provides for international recognition of their certificate. This is an undoubted advance on the existing state of affairs, and confidence in the certificates of unknown sanitary authorities is a plant of slow growth, yet it is believed that some international confidence will in time be established. Certainly, the policy of non-intercourse between countries desiring to trade with one another is a relic of mediæval barbarism. Sanitary science has nowhere made greater advances than in its appliances for complete and safe disinfection.

INOCULATION AS A PREVENTION OF YELLOW-FEVER.

The exhaustive researches of Surgeon Sternberg, of the Army, into the question of the etiology of yellow-fever, and especially upon the prevention of yellow-fever by inoculation, has been published in the last report of the Marine-Hospital Service, and is sufficiently detailed to enable any one to draw their own conclusion as to the value of the inoculation. For myself, I may say that notwithstanding all that has been said in favor of the methods of inoculation as a preventive of yellow-fever, we must admit that since the time of the alleged discovery of Freire, Rio de Janeiro has been visited by a most disastrous epidemic of yellow-fever, the mortality of which was fully as severe as that of previous epidemics ; in fact, today, the only country from which the United States is seriously threatened by the sending out of yellow-fever fomites is Brazil, and the place, the city of Rio de Janeiro.

I suggest that this section take the papers of Sternberg and the more recent statistics of Freire, both of which I take pleasure in laying before you, and examine carefully those statistics, for the purpose of ascertaining whether they are or are not such as carry weight to the mind of an unprejudiced person.

I am the more ready to do this because of the claim made by a very distinguished gentleman, a member of the American Medical Association, one for whom I entertain the highest respect, that notwithstanding the researches of Dr. Sternberg, the statistics of Freire, as now published, have refuted every opinion adverse to his method. I submit, then, in view of this discrepancy, whether this section does not owe it to itself, and to the association, to appoint a committee of investigation of the papers presented, with a view of formulating an opinion that may settle this controversy, so far as the opinion of the association is concerned.

PHYSICAL CULTURE.

Preventive medicine must look beyond the topics of epidemiology and general hygiene, if she wishes to accomplish the greatest good to our beloved country. She should see to it that the children are healthy and strong, thus giving an earnest of a hardier race yet to come ; this may best be done by the encouragement of physical training in the primary schools, as well as in the colleges, and the individual effort and influence of the members of the American Medical Association would be one of the most potent factors in bringing this matter to public attention.

THE WORK OF THE SECTION.

I now present to you the programme of the daily work of the section, so far as completed, and trust that it may be adhered to so far as possible, with a view to economy of time, and in accordance with the custom of the association, which directs that such improvements in the section work shall be suggested, from time to time, by the chairmen, as may occur to them, I have to say that the Secretary has prepared a register of the names of those in attendance, and a record book wherein to transcribe the minutes of the section. It has been found impracticable to keep in memory alone a record of the proceedings of former meetings, reports of committees and various standing committees that are appointed from time to time. I have, therefore, thought that a record book, which can be transmitted from secretary to secretary at each annual meeting, will be not only a business way of conducting the affairs of the section, but of great convenience.

STATE MEDICINE.

ABSTRACT OF THE ADDRESS OF ALFRED L. CARROLL, M.D., AT THE FORTY-FIRST ANNUAL MEETING OF THE AMERICAN MEDICAL ASSOCIATION, NASHVILLE, TENN., MAY 21, 1890.*

To the average intelligence, sanitary science has come to mean only a certain smattering of sanitary engineering, and this solely as regards sewerage and plumbing work; to the exceptionally specialized scientific mind, its definition is conterminous with the artificial cultures and stainings of the bacteriological laboratory. Avoiding these extremes of macro-mechanics and micro-biology, my present purpose is to discuss sanitation as concerning the things which the State may properly do for the preservation of health.

There is a wide difference between what we might do, theoretically, and what we can do, practically; and this difference is not always borne in mind by those who with laudable intentions seek to antedate a hygienic Utopia. We could doubtless abolish communicable diseases by seizing and cremating all infected persons and things simultaneously throughout the world; but it is more than doubtful if the public at large would placidly consent to such a general holocaust. We might theoretically save thousands of infants from falling victims to improper feeding and parental mismanagement, if we could assume supreme control of them; but not even the New York Society for the Prevention of Cruelty to Children has yet proposed to take all babies away from their mothers—its powers being apparently directed to preventing their earning a comfortable livelihood at a later age.

We might stamp out syphilitic infection, if legal restrictions could be made to enter the innermost recesses of private life and preside over all sexual relations; but experience has proven that, although we may vastly diminish the avowed channels

* In the absence of Dr. Carroll read by title and referred for publication.

of its dissemination, clandestine prostitution and more indirect modes of transmission will foil the completion of our precautionary measures as long as human nature rests upon an anatomical basis. We might even effect a scientifically progressive improvement of mankind, if we could enforce the stirpicultural selection employed by breeders of the lower animals ; but the marriageable age is apt to be denominated by sentimental affinities, and the loving fancies of youth's springtide are beyond the reach of our autumnal philosophy. An absolutely rigorous Chinese-wall quarantine of exclusion, if it were possible, might work preventive wonders ; but in the needs of civilized communities some commercial interests are even more important than the dangers which may accompany them, and while waiting for the altruistic sanitary millennium, when exportation rather than importation of disease will be checked, our principal safeguard must lie in the abatement of the local insanitary conditions which furnish a soil for the implantation and multiplication of the *materies morbi.* Medical inspection and isolation of the infectively sick, with disinfection of contaminated things, will always be prudent ; but the antiquated mockery of quarantines is as ineffectual as it is vexatious, and must erelong be abandoned by all intelligent nations.

Since the days of the old Crusades fanaticism has played a stimulating part in the inception of great enterprises, and now, as then, in all new efforts to promote the general weal, unbridled energy tends to overleap the bounds of wisdom, and sometimes needs restraint. In our modern crusade for the glorification of the Temple of Health the campaign was sagely outlined by such great chieftains as Chadwick, Farr, Parkes, Simon, and others ; yet lesser leaders of brigades or companies are here and there found, whose impulsive valor outstrips discretion, and not only embitters the antagonism of our foes, but impedes the advance of our standard. To drop the metaphor, we should remember that sanitary science is still in its infancy, and that until our knowledge of etiology shall be far more certain, we must be cautious lest undigested dogmatism, founded on hypotheses, arouse opposition and ridicule from the people whom we wish to benefit. Even now, under enactments which in several of our States make health-boards legislative bodies, and exempt their decisions from appeal or review, hard and

fast rules are often framed from individual opinions, unsupported by demonstrable facts, and things are done which would hardly be tolerated elsewhere. Under a constitutional monarchy, the "liberty of the subject" must be maintained; but as we are all sovereigns here, there are no "subjects" to protest, and consequently no personal rights which any officials, from policemen down to State legislators, are bound to respect; the theory of our democratic system apparently presupposing that a public appointment necessarily carries with it the sudden inspiration of perfect wisdom, unbiassed by any previous study of the scientific problems involved. In villages, where health-boards of laymen are appointed from year to year by not always sapient trustees; in rural townships, where supervisors and justices of the peace constitute, ex-officio, the local boards—even in cities wherein political considerations are not altogether dissociated from sanitary organizations—a little knowledge may be a dangerous thing when clothed with brief authority, and is almost sure to be an obstacle to advancement of understanding or improvement of methods.

The proper function of sanitary boards in their relation to the affairs of individuals is to prohibit or abate whatever is unmistakably perilous to public health, not to assume a finality of dictation. In their supervisory capacity, it is within their legitimate province to see that architectural and engineering plans, in respect of domiciliary drainage, refuse disposal, and other essentials for human habitation, satisfy the sanitary requirements whereon all authorities are agreed; but the diversities of opinion among experts in the constructive arts as to the best manner of mechanically satisfying these requirements testify to the unwisdom of insisting upon particular specifications. As an abstract proposition, we may admit that a room devoid of cornice, carpet, curtains, upholstered furniture, or other lodging place for possibly infected dust would be most easily kept in hygienic safety; it has not, however, thus far been seriously proposed to deprive luxury-loving millionaires of their æsthetic decorations and multitudinous bric-à-brac, and to confine them to four plain walls and a bare floor, with a few hard wood chairs, and an iron bedstead for all equipment—although it has been officially urged that consumptive invalids should be so unornately housed, and although, in

sundry places, alcoves and other irregularities in the shape of apartments are proscribed by formal resolution, while school children are left with a hundred cubic feet of space per capita. In my own enlightened metropolis—where, by a singular exercise of legislative omniscience, the President of the Health Department must not be a physician, and the medical member of the commission is in the position of a vulgar fraction with an insignificant denominator—no unofficial citizen, be he never so skilled in sanitary theory and practice, may let his invention transcend certain established rules, though he build solely for his own residence. Some of you may remember that in the International Health Exhibition at London, in 1884, there was shown a model "sanitary house," constructed under the special joint supervision of the best known practical sanitarians in England. It is human to err, and of course no scheme can be so perfect as to escape criticism in some details; but one might at least suppose that men of such repute as Corfield, Douglas Galton, Rogers Field, and Ernest Turner, could be trusted to plan a simple edifice which would not gravely threaten the lives of its inmates. Nevertheless, one of the most competent inspectors of our Health Department told me that under the regulations of the board, the erection of such a house would not be permitted in New York. Per contra, some of the plumbing specifications inflexibly ordained in several of our cities are distrusted, if not condemned, by sanitarians abroad.

To define more clearly my meaning as regards interference in private life: While I concede the necessity of giving to boards of health discretionary control over many things which cannot be foreseen, and which "in their judgment" are "detrimental to public health," I submit that such judgment should be founded on undeniable facts, and that the "police power" of the Legislature, which is delegated to these boards for an explicitly circumscribed purpose, can equitably supersede written law only in cases of "dire emergency." I do not wish to contend for the right of the individual to injure his own health, much less to do aught which injures the health of his neighbors; but I do insist that we should be very sure that our favorite way of attempting to solve a given problem is the only safe way, before we force him to adopt it; and I

more than doubt the justifiability of preventing him from eating oleomargarine or drinking skimmed milk, if he knowingly choose to do so. It should be remembered that in all sanitary legislation danger to "public health" is the fundamental reason and excuse for official intervention. With this in view, domiciliary intrusion may be requisite to abate conditions which can extend their baleful effects to the surrounding population ; a pardonable latitude of interpretation may enable us to protect minors and other persons incapable of protecting themselves from manifestly deleterious influences, forasmuch as the future, if not the present, sanitary welfare of the community is therein concerned ; but ours is not a paternal government, and the widest liberty of judgment and action consistent with public safety is the birthright of every citizen.

The sanitary duties of the State to the public consist in protecting the purity of soil, air, water, and food, and guarding against the propagation of preventable disease, as far as may be practicable. In urban communities, these duties involve drainage, paving, and cleansing of streets, an adequate system of sewerage and scavenging, and a sufficient and wholesome water-supply, as well as the supervision of food purveying and the abatement of certain nuisances. In most cities, however, the principal parts of municipal hygiene are assigned to independent boards, organized chiefly for the benefit of practical politicians and contractors. Drainage, like the snakes in Ireland, is conspicuous by its absence ; with a very few honorable exceptions, our pavements are examples of what should be avoided, and their cleansing is left to the casual operation of natural laws ; sewerage and the ultimate disposal of sewage are oftener productive of mischief than of safety ; scavenging affords an unearned increment of income to numerous exiles from verdant Erin or sunny Italy ; and of the sources of water-supply to many of our municipalities, if the reports of chemists and inspectors are to be believed, the less said the better, out of consideration for the sensitive susceptibilities of "teetotalers." In these matters, sanitary advice is seldom sought, and if proffered, is commonly unheeded.

The dangers from the aggregation of dead bodies in cemeteries and consequent pollution of soil, air, and often of water-supply—especially in rapidly growing communities where hab-

itations of the living extend around burial-grounds—have been too often exposed to need recital here ; but these are usually chartered evils, hedged about by popular sentiment, and beyond the direct control of boards of health, unless the harm which ought to have been prevented has actually and irremediably occurred. We have not even the statutory limitations of the area and depth of graves and the intervals of reopening, which exist in nearly all European countries ; nor can we enforce the salutary provision that when cemeteries are abandoned they shall not be used for dwelling-places.

On the other side of the question, boards of health are in many instances charged with or voluntarily assume functions foreign to their proper purpose. The examination and licensing of practitioners, and the direction of the curricula of medical schools, howsoever desirable in themselves, pertain to curative rather than to preventive medicine, and would be more appropriately allotted, as they are in older countries, to another department of the State than that which is created to preserve people in health, not to prescribe their treatment when they are ill.

In the registration of vital statistics, again, boards of health are burdened by legislative action with details which in no wise belong to them. The sanitarian is interested in learning how many children of each sex are born, and, in a composite population like ours, the race or nationality from which they spring. He may even take an indirect and somewhat sentimental interest in their legitimacy or illegitimacy, but he cares nothing for their names or those of their parents. He wishes to know the number of deaths at different ages and the causes thereof, as far as the more than occasional incertitude of diagnosis can yield such information ; the occupations and local habitations of the decedents also are useful items for his calculations ; but with their pedigrees for two or three generations he has no more business than with their bank accounts. All these genealogical particulars, which serve only for the identification of the individual, are of exclusively forensic purport, needful to decide litigations about inheritance of property, and, therefore, of value to citizens with pecuniary expectations and poor relations, but have no more connection with public health than the legal technicalities of drafting a will or fram-

ing an indictment. And yet, to enable boards of health to perform such inappropriate work, the already overtaxed physician is often called upon to collect personal biographies and family histories, under penalty of fine or imprisonment if he fail in his capacity as an amateur census taker. If he attend a charity patient in parturition, he is expected to record the names, ages, birthplaces, and occupations of both parents, the mother's maiden name, and sundry other domestic circumstances, and, unless an immediate agreement be reached as to the baptism of the infant, to make future unremunerated visits in order to report its prænomen. Similarly, after his professional services have been brought to a close by the death of a client, he is held responsible for the completeness of the record of that client's birth, parentage, social condition, length of residence in his or her last abode, the number of persons living under the same roof, and divers collateral formalities which are equally impertinent, in addition to certifying the cause of the demise. To cap the climax of irrelevancy, sanitary bureaus are required to register full, true, and particular accounts of all persons entering the estate of wedlock, for which accounts they are empowered to exercise compulsion on clergymen and magistrates, notwithstanding that in the State where this enactment originated neither a civil nor a religious ceremony is necessary to constitute a lawful marriage, and that the Act which imposes such clerical eccentricities was titularly one "for the preservation of the public health."

Aside from the evident injustice of demanding from medical practitioners unpaid services outside of their vocation, some of the methods adopted tend to defeat their own purposes. For the registration of births reliance has been virtually placed upon the obstetrician alone; but in the population at large nearly half of these events occur without medical attendance, under the covert auspices of unqualified midwives as ignorant of law as of physic, or frequently among pluriparæ of the poorer class, with no extraneous aid beyond that lent by an obliging neighbor. These commonly escape registration, and render our records worse than worthless, because misleading. Even with the elaborate machinery of the Health Department of the city of New York, the published birth-rate is so far below the mortality that if it had the slightest pretence of accuracy,

philanthropic statisticians would regard with dismay the approaching extinction of the native population. Despite the energy and industry of the registrar, despite the pains and penalties threatened for all derelictions, it is probable that at least 30 per cent of the natality is consigned to oblivion. Obviously, to secure full returns, we should have recourse, in the case of a birth, to the parents or custodian of the child ; in the case of a death, to the undertaker or other person conducting the funeral, who, as a condition for obtaining a burial permit, must present the stipulated form of record, including the medical certificate. If the registration of marriages is to be attempted at all under the inconsistent legislation of some of our States, it should be transferred to a different recording department, and could not then be made complete unless the bridegrooms and brides, for the benefit of whom and of their prospective offspring it is intended, report their connubial contracts.

Another usurpation of authority which seems to me to be quite indefensible is the ordinance, enforced by many boards of health, compelling physicians to report all cases of infectious disease occurring in their practice. In New York, especially, this conflicts with a State law which forbids the revelation of any information obtained in medical relations with a patient, and places the practitioner between the horns of a dilemma involving a suit for damages if he make the report, or a heavy fine if he do not. Moreover, the popular fear of forcible bureaucratic invasion leads to concealment of contagious cases, without medical care, and thus, perhaps, to an increased morbility, if not mortality, from the very maladies which it is desired to limit. Nor is this popular fear altogether unfounded, in view of the proclivity sometimes shown by sanitary officers to interfere in questions of diagnosis and treatment. Cases of measles have been sent to small-pox hospitals ; remittent has been officially pronounced yellow-fever, and the patient removed to a public institution ; a physician of high standing has been imprisoned without process of law for differing in opinion from a sanitary inspector as to the nature of an ailment ; and other less glaring intrusions into the domain of private practice have been annoyingly frequent. Among ignorant or economical people, cases of measles or

scarlatina, unless very severe, are often carried to convalescence under purely domestic management ; mild attacks of diphtheria are unrecognized, or treated with the traditional red flannel bandage and somebody's patent throat-lozenges ; variola has repeatedly been hidden from observation until its extension forced it into notice ; comparatively few cases of enteric-fever in poor neighborhoods are brought to professional recognition until infection of the environment has already happened. It is, of course, of great consequence for the public safety that early notification of the existence of infectious disease should be given ; but with regard to both efficiency and equity the onus of giving this information should rest upon the householder or head of the family in which it exists. The State has a right to declare that none of its residents shall knowingly conceal upon his premises a source of peril to the community ; it has no right to force a visiting physician to violate professional confidence or to act as an unsalaried detective.

The discovery of the tubercle bacillus has so filled the minds of many pathologists as to exclude the question if there may not be an antecedent morbid condition which produces a habitat for the microphyte, and arguments apparently pointing to the influence of heredity or other etiological factors are met by the hypothesis that the bacillus may be implanted at or before birth and remain latent for years, nay, through an entire generation ; and the morphological twinship of this bacillus with that found in leprosy is used, not in hesitation as to its specific pathogenic power, but to erect a family relation between the two diseases. But even if we were surer than we now are of the bacteriological causation of tuberculosis, its abolition by municipal ordinance would hardly be practicable. The majority of wayfaring poitrinnaires have not had a careful physical examination and skilled diagnosis of their disease, and have neither the means nor the inclination to carry about with them patent disinfecting pocket spittoons ; factory operatives, despite what they consider as "a bad cold," will continue as long as possible to earn a living for their families ; much of our clothing will be made by phthisical tailors and sempstresses ; chronic consumptives will resort to churches, theatres, and hotels ; we ourselves shall send patients by "palace cars" and "ocean greyhounds" to other climates ; and indiscrimi-

nate expectoration will probably defy sanitary precept as it has long defied social objurgation. Furthermore, since tubercle bacilli are found also in the fæces and urine, the detrusion of either of these excretions, save in distant disinfected solitude, must be prohibited to satisfy the fastidious bacteriomaniac.

The little explored field of the pathology of the lower animals gives glimpses of the ancestry and evolution of some of the diseases of mankind, and may in time furnish much help to preventive medicine. Already we have learned that cattle are subject to tuberculosis, and we suspect that the *materies morbi* is often conveyed to man through their milk or meat ; indeed, according to the researches of Dr. E. F. Brush, human tuberculosis has nowhere prevailed until after the introduction of milch cattle. But, unfortunately, these animals frequently present no recognizable symptoms of the malady with which they are afflicted, and the diagnosis can only be made post-mortem—a method scarcely within the permissible scope of dairy inspection. The investigation of the "Hendon" epizootic, and subsequent observations, indicate the possibility that scarlatina may arise from an eruptive disease of the cow, though whether this disease is contracted from human patients, or spontaneous in the brute, is a question for further inquiry. The alleged susceptibility of the domestic mouse to the scarlatinal virus may likewise have some bearing upon the occasionally mysterious appearance of the disorder ; that dogs and cats may transport the infection, even if they do not suffer from a modified form of the exanthem, is an accepted doctrine. Diphtheria affects several genera of animals, notably barnyard fowls and pigeons. We know, if not the primal origin, the proximate sources of glanders, hydrophobia, anthrax, actinomycosis ; we have become acquainted with the Oriental filaria sanguinis and its transference to drinking-water by the mosquito ; with the canine echinococcus and the porcine cysticercus ; we are still debating whether the hog gets trichinæ from the rat, or *vice versa ;* cases of entero-colitis in infants and infectious aphthæ in adults have been traced to "foot and mouth disease" in kine ; profound anæmia is induced by the anchylostomum duodenale, the embryos of which lead an independent aqueous existence, undergoing various changes of

form and habit ; the distomum hæmatobium passes through multitudinous transformations, and inhabits temporarily the bodies of fish, mollusks, or small crustaceans, before it can excite hæmaturia or "Egyptian dysentery" in the human system ; and, beyond these grosser parasites, we may yet learn that the contagia of other diseases have their intermediate hosts and transitional modifications.

From the vegetable as well as from the animal kingdom, some already known, and mayhap some yet unknown, pathogenic elements may invade our diet, and, to an extent commensurate with our actual knowledge, sanitary administration is justified in controlling the public food-supply. The sale of diseased food may properly be stopped—with a saving clause touching *paté de foie gras* and its epicurean congeners ; decomposing food may be condemned (except, perhaps, in the case of "high" game suppers), because we know something, and are daily learning more, of the alkaloids of putrefaction ; adulterations come within our ken if they be directly or indirectly injurious to health, but mere trade frauds, such as the admixture of flour with mustard, or chiccory with coffee, fall more fittingly under the jurisdiction of statutory law, which is quite competent to deal with them. I cannot agree with an acquaintance of mine in the public sanitary service who, being himself a dyspeptic, classes foods according to their comparative digestibility, and holds that strawberries should be declared dangerous to public health because they give him urticaria.

So with regard to the abatement of nuisances, of which the sanitary and legal definitions differ widely. The latter includes anything which impairs the enjoyment of life and property ; the former concerns only things which may be deleterious to the health of the community, and cannot by the most forced construction be made to comprise the inconvenience of cock-crowing or piano-practice. Noxious trades should be controlled and, if necessary, suppressed, by sanitary authority, but an odor from a manufacturing process may be disagreeable without being dangerous to health, and in such case the remedy lies elsewhere.

Waning time admonishes me to curtail a list of examples which might be extended almost indefinitely, but I have per-

haps said enough to support the conclusion forced upon me by study and experience, which is this : Sanitary administration, like all other governmental intervention in a free country, can be legitimately exercised alone for the welfare of the community, interfering with the individual only when his actions imperil his neighbor. Bearing always in mind the limitations of our present knowledge, our sanitary regulations should be cautiously based upon established truths and executed with scrupulous discretion. The position of health officer should everywhere be a career, not an episode, and for this he should be specially trained, and his tenure of office should depend solely on his efficiency. For the real advancement of hygiene, the people themselves must be educated to co-operate with us for their own good ; every avoidable attempt at coercion arouses opposition and retards the end we have in view.

In these propositions I may be at variance with some enthusiastic sanitarians for whose conscientiousness of opinion I entertain the greatest respect ; but I believe that I shall have the concurrence of the majority of the profession and of the intelligent public.—*Journal Am. Med. Association.*

The Lepers of Molokai.—Father Damien's heroism has already inspired new zeal in the hearts of his followers. Miss Amy Fowler, or Sister Rose Gertrude, as she will henceforth be called, is a young Englishwoman, who will be the superior of the Lepers' Hospital in Molokai. She studied medicine several years in Paris, and was at the Pasteur Institute. She carries a little prayer-book said to have been found on the chest of the Prince Imperial when carried dead from the battle-field in Zululand. This touching prayer is on the fly-leaf :

" If thou only givest on earth a certain sum of happiness, take, O God, my share and bestow it on the most worthy. If thou seekest vengeance on man, strike me."

This seems to be the motto which has inspired this young girl to leave her luxurious home and devote her life to the lepers of Molokai.

IMMIGRATION AND ITS DANGERS AT THE PORT OF NEW YORK.

ABSTRACT OF THE ANNUAL REPORT OF WILLIAM M. SMITH, M.D., HEALTH OFFICER OF THE PORT OF NEW YORK, FOR THE YEAR 1889.

FIVE thousand, five hundred and seventy vessels from foreign ports were inspected; being 279 more than the previous year, but 2257 less than were inspected in 1880. This difference is owing in great measure to the substitution of steam for sailing vessels.

The inspection of domestic vessels from ports south of Cape Henlopen commenced on May 1st. Seventeen hundred and forty-one vessels from southern ports, subject to quarantine, were inspected between that date and November 1st following.

IMMIGRATION.

Three hundred and fifteen thousand, two hundred and twenty-seven passengers have been inspected who arrived at the quarantine during the year, exclusive of 96,686 cabin passengers who arrived during the same period; but the number is 68,368 less than in 1888. The whole number inspected at this quarantine since January 1st, 1880, is 3,638,807.

The statistics of the immigration to this country for the past ten years do not indicate an ebb in the flow of this vast tide of immigrants to our shores. Political and economic conditions in the old world are more likely to increase than diminish the number of those who seek homes in the great area of unsettled country, and employment in our undeveloped mines and unexplored forests. It is equally certain that in the future, as in the past, a large proportion of the immigration will pass into the country through the port of New York.

A large proportion of the immigrants are so poor that during the journey to and at the port of embarkation they seek the poorest, because the cheapest lodgings obtainable. In these places they are often exposed to the contagion of some

of the most fatal of the diseases which afflict the human race. Diphtheria, scarlet-fever, and small-pox frequently, and sometimes typhus-fever come hand in hand with the immigrant. Under these circumstances, ceaseless vigilance and the closest scrutiny are necessary to arrest developed cases in some of their modified forms.

The great exposure of the immigrant passengers to the contagious diseases that exist among interior old world communities or at ports where this class embark, as compared with that which is experienced by passengers of the first and second cabin, is well illustrated by the fact that of the 656,726 passengers of these classes that have passed the quarantine in the last ten years, there have been among them but two cases of small-pox, as against several hundred found in the steerage during the same period.

Since my last report 254 passengers have been detained at the quarantine of observation on account of suspected exposures to contagious diseases, for periods varying from four to fourteen days.

MEDICAL OFFICERS OF PASSENGER STEAMSHIPS.

The carelessness or ignorance of medical officers of passenger steamships continues to give rise to endless anxiety on the part of the health officers at quarantine. If the detection and removal of developed cases of contagious diseases among passengers on their arrival at quarantine were all that is necessary, the embarrassment and responsibility of the quarantine officer would be comparatively insignificant. It is the possible existence of latent contagion among the well passengers, which has been communicated to them by exposure to developed cases of disease through failure of the medical officer of the steamer to detect the character of the disease sufficiently early to properly isolate the sick, that gives occasion for anxiety to the quarantine officer.

In many such instances the medical officer seeks to save himself from censure by making every possible effort to conceal the exposure of well passengers to the contagion from the sick.

One of the two cases of small-pox referred to among the saloon passengers was found on a transatlantic passenger

steamer this season, and it well illustrates the inexperience, if not the incapacity of some of the medical officers of passenger steamers.

The deputy health officer on duty November 8th, last, reported a case of suspicious eruptive disease on the person of Louisa F. Daligny, aged 55 years, a first-cabin passenger, that the medical officer of the steamer insisted was a case of *acne*. The officer refused to give the steamer *pratique* without consultation. It required but a brief examination of the case to determine that it was a case of small-pox, modified to some extent in the development of the eruption by vaccination in early life. Notwithstanding the well-marked evidence that the disease was small-pox, in the third day of development the doctor tried hard to convince the quarantine officials that it was an eruptive disease (*acne*) to which the patient was subject ; and, without doubt, he had persuaded himself that such was the case. The patient in this instance had been confined to her room by another ailment for several days previous to the development of small-pox and until arrival at quarantine. To this fortunate circumstance the cabin passengers who were susceptible to the contagion of the disease owe their escape from it ; and to the same cause the steamship company are indebted for their exemption from the expense incident to the detention of the steamer and maintenance of the passengers during the incubative period of the disease (14 days).

Neglect on the part of the medical officer to detect the contagious diseases that develop among passengers during the stage of invasion, and to properly isolate them when discovered is but another name for incompetency, and is even less pardonable than the ignorance which prevents their prompt recognition and their proper management.

The *British Medical Journal* said some time since in relation to the qualifications of the surgeons of steamers : " The market is overstocked." . . . " He" (the surgeon) " is appointed with little reference to age, experience, qualification, or character, and when he enters on his duties he is badly paid, badly accommodated, and badly treated." . . . " It would be more than ridiculous to expect that under the present most unfavorable conditions any medical man of such attainments as would secure success in more promising walks of the profession can

be induced to devote his life to the service of the mercantile marine."

The *Lancet* (London), in an article on the same subject, declares that "the ship-surgeon's pay, from five to ten pounds sterling per month, is ridiculously small when the work he has to do and the responsibility placed upon him are considered."

A young surgeon of one of the German steamers, when asked what he was paid for services, replied, 120 marks per month (about thirty dollars); when surprise was expressed at the inadequacy of the compensation, he apologetically replied, "I am just going to make two or three voyages here, then the same to Brazil, to see the countries, when I am going home to practise my profession."

It is to such physicians that the lives and health of many thousands of immigrants not only are yearly intrusted but of those with whom they mingle in this country.

If the condition of the medical marine service on English vessels invites adverse criticism on the part of our humanitarian and professional friends in England, where immigration is unknown, how much should it interest the same classes here; how much more does it affect our own people, among whom a great bannerless army of more than half a million people is annually scattered, who may, through the inefficiency and unreliable character of the ship's surgeon, convey latent contagions to near and far communities of our own people?

The remedy for this state of things is not hard to prescribe, but it is much more difficult to secure and apply—to wit: Employ competent and faithful medical officers on passenger steamships; men whose intelligence, experience, and vigilance will enable them to detect infectious or contagious diseases in their initial stage, and whose character and standing in the medical marine service will be a guarantee against any effort to deceive or mislead quarantine officials. This would be the most satisfactory remedy for one of the greatest difficulties which the quarantinist has to encounter in this country. As before stated, to obtain the remedy is quite another and more difficult undertaking than to prescribe it.

At a meeting of the representatives of State Boards of Health, held at Washington, D. C., December 8th and 9th, 1884, a resolution was unanimously adopted requesting the

President of the United States to appoint two commissioners to confer with a like number of commissioners to be appointed by the "Local Government Board" of England, in relation to the qualifications, compensation, etc., of the surgeons employed in the merchant marine service. No action was taken in the matter. The medical and sanitary administration of ocean steamers is the same now as then, so far as governmental action is concerned.

There is little cause for complaint of the qualifications and discharge of duties of the surgeons of most of the best of the transatlantic steamship companies—those particularly whose express service and palatial accommodations invite and secure a fair proportion of the patronage of first-cabin passengers to and from Europe. The compensation which surgeons on these steamers receive from the companies does not exceed fifty dollars per month; but the gratuities received from cabin passengers make up an aggregate of compensation which invites surgeons who are not only capable and efficient, but who desire to make their tenure of service on such steamers as long as possible. But a considerable portion of immigrants cross the Atlantic on steamers of an inferior class, the medical officers on which receive as their only compensation the beggarly salary given by the company.

The lives and health of 150,000 immigrants have been intrusted during the past year to the care of medical officers whose compensation did not exceed or equal that of the chief steward of the steamer. There is no more crying evil in the transatlantic passenger steamship service at the present time than the inefficient medical service on many of the regular passenger steamers to this port.

A remedy for this, it is believed, will be found in the following:

First. A *medical marine service* under the control and management of the Government (or a board of control responsible to it) whose flag the steamer flies, will be the first and most important step toward reform.

Second. The adoption by such authority of the following rules is essential:

1. Medical officers with good professional qualification and high character.

2. Adequate compensation for the medical officer. The minimum compensation for properly qualified medical officers should be not less than $100 per month.

3. The service should provide for promotion to the charge of better class steamers of the line, with increase of rank and compensation proportionate to length of service and general efficiency.

4. The surgeon's tenure of office should depend on his ability and efficiency, and his discharge from service should be effected only by charges made and sustained before the Government board which certified to his qualifications for appointment.

5. Marine medical officers in charge of passenger ships should have their duties distinctly defined, their responsibilities clearly determined, and their status as officers well understood through rules and regulations made by a supervisory board.

6. The authority of the medical officer should be independent and absolute in those medical and sanitary matters which affect the lives and health of those on board the ship, or which may, by neglect or improper management, expose the health of the people of this country.

The pernicious effect of interference by the captain of a passenger steamer with the duty of a surgeon was well illustrated some time since on the arrival of a steamer with a case of small-pox in one of the crew of the steamer.

The surgeon of the steamer had judiciously isolated the case, and while the case was still in hospital the doctor put another man in the room with the patient, in the belief that he was suffering from the initial symptoms of the same disease. This did not prove to be the case ; the man was able to return to duty the morning before the arrival of the steamer at quarantine, but was very properly detained in hospital by the surgeon for such disinfection of the clothing and disposition of the man as the health officer might think best to make. The captain demanded to know of the surgeon why in h—l the man was kept in hospital if able to work. The explanation was not satisfactory, and the seaman was imperatively ordered on duty. On the steamer's arrival at quarantine a few hours afterward, the surgeon was asked why the man had been allowed to

mingle with the crew of the steamer with his clothing filled with the contagion of the disease with which he had been associated for several days. The doctor told the facts with evident reluctance, and said to the health officer, "I am sure I shall lose my place for telling you." The captain was told that it was neither proper nor profitable for him to interfere with the duties of the surgeon of his steamer; and the lesson was enforced by the necessary detention of the crew fourteen days for observation. This disregard of the opinion of the medical officer—this tyranny, not often as marked as in the instance given, is the natural result of his having no status—no independent authority which is established and sustained by a power superior to those with whom he associates as an inferior.

The contagion of those diseases which frequently come hand and hand with the immigrant, and whose period is greater than the time necessary for the voyage to this port, has been referred to in previous reports, as being a prolific source of danger to the public health; but the adverse criticisms not unfrequently expressed and sometimes published when a case of small-pox develops in an immigrant after passing quarantine, by those who are ignorant of the law which governs the development of the disease, seem to justify a reference again to the fact that the time between the reception of the contagion of small-pox and the development of the eruption is fourteen days; while the average time of passenger steamers from European ports to New York is less than nine days; and many make the passage in much less time.

There is time enough, in many instances, between the reception of the contagion and the development of the disease for passengers to cross both the Atlantic and American continent. In some of the developed cases found on ships on their arrival at quarantine, it has been evident that the disease was contracted *en route* from the home of the immigrant to the port of embarkation; but in most cases they were infected at or near the port from which they sailed.

Frequent appeals have been made to the agents of steamers to have frequent and thorough inspections made of immigrant lodging-houses at the ports of departure of their respective lines.

Their interest in the prosperity of their lines justifies the

belief that the agents at this port have done what they could to secure a proper supervision of such places.

The emigrant resorts in English ports, at the French port of Havre, and at some of the German ports, it is believed are efficiently policed.

The steady decrease in the number of cases of small-pox on passenger steamers for years past warrants the belief that prompt notice to the health authorities at the port or place where the infection was contracted, through the agents of the line or the consular representative at New York, of the government to which the steamship line acknowledges allegiance, will materially contribute in the future, as it has during a few years past, to steadily lessen the number of instances in which the contagion of this and of other diseases is imported into our sea-board and interior communities before their development. Immigration "has come to stay" for many years, and the health authorities in this country should treat the sanitary and health subjects connected with it with reference to its permanency.

The number of cases of small-pox on vessels that arrived at this quarantine during the year 1889 was 15; the number in 1888 was 57.

Early in the year last past the different passenger steamship companies were reminded of the suggestions to them, and instructions by the health officer for the direction of the surgeons of their steamers. A brief recapitulation of these instructions seems proper:

First. Intending immigrants on arrival at the port of embarkation should receive attention and direction by agents of the line to prevent them from going to lodging-houses suspected of being infected with contagious diseases.

Second. Immigrants should be inspected as they go on board, and none but the well allowed to proceed.

Third. Refuse passage to immigrants from cholera-infected districts.

Fourth. Reject immigrants from localities where small-pox prevails as an epidemic unless they have been successfully vaccinated, and in case of adults within the last five or six years past.

Fifth. Examine steerage passengers soon after they come aboard, and vaccinate all who are not sufficiently protected.

Sixth. The *vaccina* should be obtained from a reliable source, and *must* be kept in a refrigerator to insure success in its use.

Seventh. Morning and evening inspection of passengers by having them *pass before* the medical officer is essential to detect small-pox in its initial stage.

Eighth. Hospitals for the sick of contagious diseases should be located on the upper deck, forward or aft, and ventilated from the top.

Tenth. The patient should not be allowed to leave the hospital until examined by the quarantine authorities, and if an attendant is put in the hospital with the patient he should not be permitted to leave it until the quarantine officer directs.

Eleventh. Attendants on the sick of small-pox, whether medical or ordinary waiters, should not go into the hospital without a garment which is removed before they mingle with the passengers or crew.

Twelfth. The hospital should be locked and the key kept by the surgeon or a trusted attendant.

In a previous report attention was called to the injustice of the law which compels the city of New York to pay the expense necessary for the care and maintenance of the sick of small-pox removed from ships at quarantine. The expense necessary for the care of the sick of this disease is a legitimate charge upon the fund arising from the per capita tax upon immigrants collected by the Treasury Department from the steamship companies. Either the General Government should pay the city of New York for the care and maintenance of such patients, or provide a hospital where they can be cared for as the immigrant sick of other diseases are on Ward's Island.

Total number of vessels inspected in the lower bay, 996.

The quarantine ship S. D. Carlton was anchored in the lower bay July 5th, and was removed from there October 21st.

This station was abandoned for the season somewhat earlier than usual, owing to the loss of one of the ship's anchors during a severe storm, and the consequent danger of drifting ashore or seaward.

Deputy Health Officer E. B. Sanborn had charge of the quarantine ship during the past season.

Observation in the light of an experience of ten years has

confirmed the conviction, entertained for a long time, that the quarantine station in the lower bay will not contribute in any respect to aid the quarantine authorities in protecting the public health when the improvements are completed which are now in progress at Hoffman Island. In the cholera epidemic which prevailed among the passengers of the Alesia and Britannia in 1887, a quarantine ship in the lower bay would have been of great service. The facilities for isolating and grouping the infected passengers then so much needed will soon be fully supplied at the quarantine of observation (Hoffman Island).

The sick of all contagious diseases, except yellow-fever, are taken from the vessel at the boarding station in the upper bay.

Cases of the last-named disease are removed in the lower bay, notwithstanding the fact that there has never been an instance in the history of this quarantine of the disease having been communicated by the sick to the well. But the vessel, the real source of the infection, perhaps, is brought into the upper bay and discharged, cleansed, and disinfected at Robbin's Reef. This has been the course pursued for generations past. If there is no exposure of the public health in discharging, cleansing, and disinfecting an *infected* vessel in the upper bay, if there is no danger in removing, at the boarding station, such eminently contagious diseases as small-pox and typhus-fever, why should the State maintain a quarantine station a portion of the year several miles seaward to remove from vessels a non-contagious disease, and then send the vessel, which may or may not be the source of the disease, to be discharged or disinfected much nearer the great cities than the boarding station, where other quarantinable diseases than yellow-fever have been removed to hospital for many years past.

The fact is that the law which requires that the "floating hospital" shall be anchored in the lower bay from May 1st to November 1st was enacted before the hospital islands were made; it was to supply a temporary necessity created by the destruction of the quarantine hospital at Tompkinsville, and has outlived its necessity and usefulness.

The "floating hospital" referred to when this law was passed (1863) was indeed a hospital, where the sick were taken and cared for. Swinburne Island hospital now supplies the

place of the "floating hospital" of that time. The ship that is now anchored in the lower bay each summer is used only as a quarantine station, and may be abandoned without any risk to the public health, after the improvements at Hoffman Island are completed.

As there is no "floating hospital," nor any use for one, sections 7 and 8 of chapter 358 of the Laws of 1863 should be repealed. And section 24 of the same act, amended by striking out that portion thereof which refers to the "floating hospital," and substituting the following:

"*The quarantine ship shall be located in the lower bay at such time and at such place as the health officer and Quarantine Commissioners may direct, with suitable accommodations for a deputy health officer and such number of men as may be necessary for the inspection of persons on board of vessels subject to quarantine, and for the disinfection of such vessels and their cargoes. And when the said quarantine ship is not located in the lower bay, it may be moored at the quarantine wharves or other secure place as the Quarantine Commissioners may direct.*"

YELLOW-FEVER.

Fear was entertained by many people that the infection of the epidemic of yellow-fever which existed in Florida last summer and fall would hibernate there and develop during the ensuing season in epidemic proportions. This apprehension was not realized, although several sporadic cases were reported at Key West.

This disease has prevailed to the usual extent at Havana (Cuba) and at other ports in the West Indies during the year past, but no cases have developed *en route* to or at the quarantine that were infected at those ports.

The fact is worthy of special consideration, as illustrating the efficiency of the system adopted at this quarantine for the exclusion of the disease, that in no instance has the disease occurred among the passengers or crew of vessels from ports known to be infected ports; the cases that have arrived were from localities where the disease was not known to exist and on vessels that carried clean bills of health.

But three cases of yellow-fever have arrived at this port

since my last report. Two of the victims died after passing Sandy Hook, and before their removal from the steamer, and the third, the day subsequent to admission to the quarantine hospital. Circumstances connected with each of these cases seemed to require an autopsy, which was made.

The steamship Cairngorm, from La Guayra, September 3d, 1889, Porto Cabella the 4th, and Curaçao the 6th of the same month, arrived at quarantine September 15th. William Wood, a fireman, died an hour before the arrival of the steamer. The man was taken sick the third or fourth day out from Curaçao, where his exposure on shore warrants the suspicion that he was infected. The United States consular bills of health from Curaçao had been clean throughout the season. The history of the man's sickness was unsatisfactory, the steamer not having any physician. The appearance of the remains warranted the suspicion that the man had died of yellow-fever. This was confirmed by the yellow, mottled, "boxwood liver," the dark brown mucous coat of the stomach, the coffee grounds fluid in it, each indicating hemorrhagic tendencies; the yellow skin, interspersed with patches of capillary effusion, and the absence in the spleen of the condition which exists in the congestive fever of the tropics.

September 16th the steamship Hondo arrived at quarantine from Greytown (Nicaragua) August 31st, and from Livingston (Guatemala). September 8th, at Greytown, Joseph Fennel, a cabin passenger, embarked. He did not leave the steamer after he came on board. He was not known to be sick until September 11th. On arrival at quarantine the man was with difficulty aroused from his semi-unconscious condition; the skin was yellow, eyes suffused, urine scanty, containing 50 per cent albumen, pulse 104 and feeble, temperature 101. His condition indicated approaching collapse. He died at the quarantine hospital the following day. The pathological condition of the liver, kidneys, stomach, and spleen in this case was very similar to those observed in the case first mentioned. Specimens of the organs were examined under the glass at the New York Hospital. The characteristic evidences of malarial fevers were absent. Dr. Frank Ferguson wrote, in concluding his detailed report of the microscopical examination: "The organs might well be those of a yellow-

fever patient. They correspond to lesions found in organs which I had from unquestionable yellow-fever patients."

The chief point of interest in this case is the apparent protracted period of the incubation of the disease, or the concealment by the patient of the early stage of its development.

The same steamer arrived again October 23d, from Livingston October 14th. William Bruns, a cabin passenger, died within an hour after the arrival of the steamer at quarantine, and before his removal from it. This man came aboard the Hondo at Livingston (Guatemala). He was taken sick the day after he embarked. The symptoms, as given by his attendant, were at the beginning nausea, vomiting of mucus, high fever, pain in the head and back, urine very scanty, not tested for albumen. Before death the ejecta from the stomach became "dark brown." The patient was comatose several hours before death. The autopsy six hours after death showed the following conditions: Skin and conjunctivæ deeply jaundiced, the toes, fingers, and ears dark with stagnant blood, gums and teeth with a grumous incrustation; dark bloody fluid had stained the clothing of the deceased, evidently the result of hemorrhage from the urinary organs. The liver superficially was yellow, mottled with minute spots of ecchymosed blood and elongated leather-colored patches. The gall-bladder contained a small amount of fluid. The subserous connective tissue of the stomach was deeply colored by the effusion of blood from the capillaries. The stomach contained an ounce or two of dark grumous blood. The kidney was congested, the infundibulum had livid spots, and the pelvis of the kidney was filled with blood.

The incubative period of this disease has not been definitely determined, but many cases that have arrived at this quarantine leads to the conclusion that the period is *less* than is usually accepted as the maximum period. The following cases, in which the time of the exposure was very certainly determined and the date of the development of the disease was known, are two of many cases that have come under my observation at the New York quarantine during the past ten years that have established the conviction that the period between the reception of the infection of yellow-fever and the initial stage of its development does not ordinarily exceed three days:

A "Sister" from the convent of the Good Shepherd near Havana (Cuba) embarked on the steamship City of Washington July 8th, 1882. On arrival at quarantine, July 12th, the Sister was found sick with yellow-fever; she was taken sick the morning of the third day out from Havana. The infection in this instance was doubtless received on the way from the convent to the steamer, either on the street or at the wharf, as no case of the disease had previously occurred at the convent.

A passenger by one of the Ward Line steamers who had been engaged in a refinery some distance from Havana, where there had been no case of yellow-fever, arrived at quarantine four days after leaving that port. He was taken sick the third day after he went aboard the steamer. He had not delayed in Havana except to call at No. 76 Cuba Street and leave some papers for the firm with which he was engaged. The infection was undoubtedly contracted on the streets through which he passed, or at the wharf from which he took a row-boat to the steamer. In mild cases the period of invasion is doubtless in many instances concealed by the patient, and the incubative period of the disease is thus apparently prolonged.

The contagious or non-contagious character of this disease has excited endless discussion in time past. There are few at the present day among those who have had opportunities to observe and study the disease who believe it is contagious; but there are multiplied proofs that it is locally infectious only. So much depends on the opinion of a quarantine officer in this matter, both as to the public health, and the commercial prosperity of those ports which, like New York are within the so-called yellow-fever zone, that a correct theory on his part is essential to an efficient discharge of his duties. If the disease is contagious, those who have been exposed to the sick should be detained at quarantine until the full incubative period of the disease had elapsed from the last possible exposure. If it is not contagious, those on board should be allowed to proceed after the removal of the sick, and such disinfection as will destroy all disease-producing germs that may have been brought from the locality or place in which the patient was infected.

To the unprofessional mind the distinction between contagion

and infection is not generally understood. It seems proper, therefore, to say that an infection originates and is propagated independent of a living animal organism—the filth of the streets, wharves, and the interior of vessels may be the *nidus* for the propagation of the most destructive of the infectious diseases. Contagion is the disease-producing principle which is created by and communicated from a living animal organism.

New York City and adjacent localities have been infected several times by yellow-fever-producing germs, which in each instance numbered its victims by hundreds, because it was considered and treated as a contagious disease. The sick were isolated with great care, while the real cause, infected ships, were allowed to remain for weeks uncleansed and undisinfected, meanwhile each day, the infection was recruiting its forces in the foul conditions of the ships until they became a veritable pest embankment, from which the infection was communicated to the adjacent shores, which in turn became new *foci* for the development and spread of the infective principle. But the infectious character of the disease was tardily recognized ; the belief in its propagation by contagion from the person of the sick had so taken possession of the minds of the people that it certainly influenced, and doubtless embarrassed the management of those quarantine officials who recognized the real character of the disease. All vessels from an infected port were forbidden by acts of the Legislature to approach within a specified distance of the wharves of the city, it made no difference whether they were infected or not. Nothing was left to the judgment of the quarantine officer.

The more intelligent members of the medical profession long since have ceased to believe that yellow-fever is contagious. Not only that, but medical authors whose opinions are received with great deference on this subject, because formed under the light of personal observation, declare that the disease is non-contagious. This opinion has been expressed also by health and sanitary organizations in this and other countries.

Thirty years ago the "National Quarantine and Sanitary Convention," a learned and representative body, after mature consideration decided by an almost unanimous vote (85 to 6) "' *that in the absence of any evidence establishing the conclusion that yellow-fever has ever been conveyed by one person to another,*

it is the opinion of this convention that the personal quarantine of yellow-fever may be safely abolished."

"The London General Board of Health, the Superior Council of Health at Paris, the Sanitary Commission at New Orleans, and other such bodies have from time to time judicially pronounced in favor of the discrimination between contagion of persons and infection of places in the causation of yellow-fever." (Reynolds's "System of Medicine;" vol. 2, page 283.)

Every year for the ten years last past, cases of yellow-fever have been taken from vessels that came from ports in the West Indies and from ports on the Mexican Gulf and the east coast of South America, and treated at the quarantine hospital. Medical officers, nurses, and the employés of the quarantine, all of whom were unacclimated, have visited and waited on the patients without reserve; autopsies of the dead have been made in most instances, the clothing of the sick has been handled, and the bodies of the dead of the disease have been prepared for interment by attendants, but not an instance has occurred in the history of the quarantine, certainly not during the past ten years, in which the disease has been communicated from the sick or their clothing to the well.

There are so many evidences that they amount to proof, that wearing apparel, bedding, etc., may be carriers of yellow-fever infection, but not from the *persons* of the sick. These fomites are doubtless impregnated with the infection from the same source that the sick were, and became themselves new *foci* of infection.

During the summer of 1856 a large number of vessels infected with yellow-fever were allowed to lie at anchor between the Narrows and Tompkinsville for days, and in many instances for weeks at a time; the infection increased in amount and virulence to such an extent that people were infected who came near the pest-burdened ships; and the clothing and bedding that were thrown overboard drifting to the adjacent shores, the region became so extensively infected that several hundred people who lived near the bay shore of Staten Island and Bay Ridge were stricken with yellow-fever.

Why should not the infection which existed in the bilge, in the hold and cargo of vessels that infected persons on board,

be communicated to the bedding or other articles that were exposed to the infection? And if these were thrown overboard and drifted ashore, why should they not establish new *foci* of infection from which, under favoring conditions, it would rapidly extend along the shore and inland?

In this connection the history of the epidemic of yellow-fever in New York in 1822 is interesting and instructive. In that year the infection of yellow-fever made a lodgment in the dock at the foot of Rector Street in New York City, the source of the infection being infected vessels that were at the dock discharging cargo. A barrier was placed at the approach to the dock, which prevented any communication with it. A few days after this was done, people were taken with the disease who were on the Broadway side of the barrier. The barricade was repeatedly moved farther up the street, but the march of the pestilence was steadily onward, until the whole of Rector Street was dangerous to the life and health of the people who passed along it. The infection was not altogether limited after a time to this street; but other streets and localities were infected, until there were 500 victims of the disease. Many of these resided in other parts of the city, but in most instances their exposure was traced to contact with the infected locality mentioned.

It is infected localities and ships that communicate the disease to the human organism and establish *foci* of infection in whatever material or place conditions exist favorable to the preservation or propagation of the disease. It would seem to be the duty, then, of the health authorities to try to emancipate the public mind from unnecessary apprehension from the belief that is generally entertained, that in every case of yellow-fever there lurks the germs of an epidemic of that disease. If the attention of those to whom the protection of the public health is committed were given to the real source of the disease, infected ships, and the *fomites* which they may carry, experience has shown that there would be no greater exposure of life and health, people would not be frightened out of their wits by sensational statements concerning a case of "yellow jack in the city," and the commerce of the port would not be burdened as it has been in years past by unnecessary restrictions and expense. The belief that yellow-fever is communi-

cated only by infection—in other words, that the germs of the disease which under favorable conditions of moisture and temperature are propagated with great rapidity in the filth of wharves and streets, in the holds and even the timbers of vessels, and not infrequently in the soil of localities where they have found a lodgment, and are communicated from *such* sources to the human being—has been the cause of the adoption of rules and regulations at the New York quarantine which have to a great extent relieved the burdens which were formerly borne by the merchants who are engaged in commercial intercourse with ports which are subject to yellow-fever.

The condition of the vessel, the crew and the passengers govern the disposition which is made of them on arrival at quarantine, rather than that of the port from which they come. The owners, consignees and officers of vessels trading at yellow-fever ports, understand that a premium is offered them if they arrive at quarantine with healthy passengers and crews, and the ships that are not infected—a premium which consists of exemption from the delay of passengers and crew, and from the expense of discharging the cargo "in quarantine."

The influence of this premium has been such that for several years past few vessels engaged in trade in the West Indies take their cargoes at the wharves of infected ports. The steamers that run between Mexican Gulf, Central American and West Indian ports receive their cargoes by lighters at some distance from the wharves, and no person except the master and executive officer is allowed to go ashore. The result is seen in the fact that there has not been admitted at the quarantine hospital more than one-tenth the number of patients during the past five or six years (exclusive of those from the cholera ships in 1887), that there was in 1881 and several succeeding years.

It is the filth, impregnated with yellow-fever germs from infected wharves carried on board the vessel with the cargo, or the infection which is communicated to the vessel by its proximity to such wharves or infected material (fomites), that infects the vessel and those on board of it.

For the reasons given, the arrival of an infected ship at this quarantine is exceedingly infrequent. On the arrival of a

ship whose history indicates that it is infected, the sick are immediately removed to hospital, and the well to the "Quarantine of Observation" where they are detained during the usual incubative period of the disease, dating from the time of removal from the ship. The vessel and cargo are disinfected *in situ* so far as possible, and the ship is required to be discharged "in quarantine." Immediately after it is discharged, the cleansing and disinfection of the vessel is commenced and prosecuted until the work is completed from the deck to the keelson. Under ordinary circumstances, three or four days after the work is begun the vessel is restored to commerce.

No vessel has been discharged of cargo "in quarantine" during the year past. It has been found necessary to discharge but two vessels of cargo since 1885. Several vessels have been discharged of their ballast in the past four years "in quarantine" that took the ballast at the wharves in ports where yellow-fever was known to exist. Under the system which was adopted previous to the date mentioned, vessels were discharged of cargo or ballast that took either at ports where yellow-fever prevailed; under the system referred to about one hundred vessels from such ports were discharged "in quarantine" each season. Reference to this subject has been made in previous reports, but it cannot be repeated too frequently if the repetition will serve to correct the popular belief that yellow-fever is contagious.

The remittent-fever of the tropics is not a quarantinable disease; but circumstances from necessity or policy have sometimes subjected patients with that disease to the care of the quarantine authorities. A remarkable illustration of the former occurred during the past summer.

The steamship Colon arrived at quarantine, June 14th, 1889, from Aspinwall. Deputy Health Officer A. W. Smith boarded the steamer and gave *pratique* after inspecting each of the passengers and crew. All were reported well. The surgeon of the steamer, R. H. Duncan, accompanied the deputy while examining the steamer and the passengers and the crew. Three days after the steamer passed quarantine information was received that the surgeon of the steamer was sick at the home of a friend in Brooklyn. Deputy Sanborn was immediately sent to visit the doctor. On his return he was

asked if the case was of such nature and the condition of the doctor was such that he would advise his removal to hospital. He replied that "he would not so advise." Dr. Duncan was under the care of J. B. Bogart, M.D., a reputable physician in that city. The following evening (June 19th) a message was received from the Brooklyn Board of Health requesting the immediate removal of Dr. Duncan to the quarantine hospital; the message charged that the doctor was suffering from yellow-fever. Deputy A. W. Smith went to Brooklyn the same night, and at two o'clock the next morning reached the quarantine hospital with the patient. The same morning the health officer visited the hospital and found him as comfortable as a sick man could be expected to be, who had been taken the previous night from his bed, carried by ambulance two miles to the quarantine steamer and thence eight miles to the hospital. However, the symptoms of the doctor were not such as to excite any apprehension—pulse 70, temperature 99.5, tongue moist, coated with whitish "fur;" there had been no vomiting or nausea; skin moist and clear; secretion of the kidneys fair in quantity and albuminous.

The following history of the case was obtained of the doctor:

"June 8th and 9th was not feeling well; June 10th had a rigor lasting half an hour; after rigor, temperature 104, pulse 120. At 2 P.M. temperature 102, pulse 90; fever continued until about 8 o'clock A.M. of the 11th, when a slight perspiration commenced and continued for two hours; temperature 101, pulse 85. Had a slight chill during the day. These feelings were experienced the 12th and 13th. On the 12th the temperature was 101 after the cold feeling had passed, and succeeding this a tendency to perspire. Said he had "yellow-fever in Bermuda, W. I., when a boy.'"

The doctor made an excuse for not reporting his own illness on arrival at quarantine by saying that he was so much improved he did not think it necessary to mention his case to the deputy health officer.

When visited the following day (21st) the pulse was 68, temperature 98½ and other symptoms much the same. June 22d, the patient was steadily convalescing; the albumen had disappeared from the urine, temperature normal in the morning, 98½ in the evening.

From the commencement of the attack ten-grain doses of quinine were taken at intervals of five or six hours for two or three days. The remission in the symptoms during each day for three days after entering the hospital was well marked, though not as great as the record of the doctor indicates before admission. The patient was visited at my request by Dr. Edson, of the New York Board of Health, late in the afternoon of the day he was sent to hospital (20th), and by Dr. Griffiths, formerly for many years connected with the Board of Health of Brooklyn, the morning of the 21st.

The history, present symptoms and condition of the patient at that time left no room to doubt that the case was one of remittent-fever; but when admitted to hospital the usually well-marked features of that disease were changed, and to some extent destroyed by the remedies used previous to admission. The patient was discharged from hospital June 26th.

The details of this case are given on account of the unjustifiable and sensational course taken by the Brooklyn health authorities in its management.

Dr. Duncan, his attending physician, and the friend of the former concur in saying that the examination of the doctor's case by the officials of the Brooklyn Board of Health was very superficial. He was ordered from comfortable quarters in the upper rooms of a friend's house in the night, under circumstances of exposure that might have seriously influenced his chance of recovery.

After his removal from the house, the family and the *attending physician* were quarantined in it for several days by order of the Board of Health. A more remarkable evidence of zeal in protecting the public from *a non-contagious* disease, it would be difficult to find.

There are many cases of disease from tropical ports that are likely to deceive any but the experienced diagnostician. The port of New York is the great *entrepôt* for the continent, of people from all countries; and it is to be regretted that there are officials connected with a municipal health department at its very threshold, who, from inability to distinguish between some of the contagious and non-contagious diseases, or, less pardonable, who seek to magnify their office by an exhibition of superserviceable zeal in protecting the public health, thus

needlessly alarm the public with exaggerated reports of the danger from which they have been rescued by extraordinary efforts to protect them—from an imaginary danger.

A fatal type of the remittent-fever of the tropics known as "pernicious remittent-fever," not unfrequently assumes features which a superficial observer is liable to mistake for yellow-fever.

In those instances in which a satisfactory history of the case cannot be obtained, as is usual where there is no physician on board, an autopsy and perhaps the aid of the microscope are necessary to determine the character of the disease. Cases of this kind are not unfrequent during the summer months; and the disposition on the part of the press, and, unfortunately, sometimes of physicians, to excite public alarm is so common when such cases are allowed to go to the city, that they are generally taken to the quarantine hospital. It is not until the later stages of "pernicious remittent-fever" that it assumes so many of the features of yellow-fever. There is no excuse for failure to recognize the disease in its early stage.

TYPHUS-FEVER.

Under date of December 26th, 1889, Dr. Cyrus Edson, chief of the contagious division of the New York City Board of Health, reported to the health officer two cases of suspected typhus-fever.

The patients were immigrants on the Westernland which left Antwerp November 23d and arrived at quarantine December 5th. The immigrants referred to, Sigmund Strauss and George Buhler, were taken sick December 17th and 20th, respectively. Marx Startment, Max Frankel and Laurence Richter, all immigrants from the same port and by the same steamer, were taken sick with the same disease; the first of the three last mentioned December 17th, and the two latter December 18th.

A girl named Rosa Bernstein, not an immigrant, was taken sick with typhus-fever January 2d, 1890. The source of the contagion in her case is not known, but was suspected to be from communication with a family of immigrants that came on the Westernland, although none of the family referred to were sick during the voyage or after they arrived in New

York. January 7th, 1890, John Goldfarb was removed from Ward's Island sick with the disease; no history of the case could be obtained. Twenty-four days must have elapsed before the disease developed from the time of exposure, if the disease was contracted in Antwerp in one case, and twenty-five to twenty-seven days in the others. This would make the period of incubation of the disease in these cases considerably longer than that which medical writers allow for the disease.

The fact that two of the patients had stopped at the same lodging-house in Antwerp, and three at another house caused the burden of suspicion to rest on the lodging-houses of Antwerp as the source from which the contagion was derived. This suspicion would be more satisfactory but for the other fact that the period of incubation of the disease was too prolonged to allow the belief that the exposure to the contagion took place at Antwerp.

If the disease was communicated from the baggage of immigrants on the voyage it is difficult to give a reason why it was not given to the immigrant himself at the time and place the clothing was infected. Whether the immigrants contracted the disease in the lodging-houses in Antwerp or their baggage there, and the disease contracted from it by the immigrant during the voyage, it seemed desirable to remove the suspicion that attached to Antwerp as the probable source of the disease. The following was therefore sent to the agents of the line at this port:

QUARANTINE, S. I., January 13, 1890.

MESSRS. PETER WRIGHT & SONS:

GENTLEMEN: The recent cases of typhus-fever that have developed in New York City among immigrants who came by the steamship Westernland on the voyage terminating December 5th, and about which I have conferred with you, seem to me to require the assistance of governmental authorities at Antwerp to prevent any further development of such cases among passengers from that port.

You had the kindness to inform me that you had cabled my suggestions to you in relation to their action. From the most careful investigation that can be made I feel assured that the contagion was contracted in the lodging-houses of Antwerp by the immigrants who developed the disease in New York.

There can be but one course that will assure the safety of passengers who stop in lodging-houses that are infected by the contagion of typhus-fever, and that is a thorough cleansing and disinfection of all such resorts. This should not be done by closing the lodging-houses, as those whose persons or clothing are already infected will communicate it to other places of nightly resort. I would urge upon your representatives in Antwerp to see and know that the lodging-houses are thoroughly cleansed and disinfected, and that the baggage and clothing of each and every habitual lodger in them are also thoroughly cleansed and disinfected.

Very respectfully,

WILLIAM M. SMITH,

Health Officer.

A copy of the letter was sent to the Belgian Consul at New York, with the request that he communicate with the authorities at Antwerp and urge upon them the necessity of cleansing and disinfecting all lodging-houses at that port. The agents of the line at New York had immediately cabled to those in Antwerp, requesting that all emigrant lodging-houses in the city be cleansed and disinfected. And until assured that this had been done, their steamers and the baggage of immigrants on board will be disinfected on arrival at quarantine.

Several times in years past this disease has developed among immigrants after they reached New York—the incubation of the contagion exceeded the time occupied in the voyage.

May 26th, 1884, Daniel Peartstein arrived on the steamship Bohemia, from Hamburg, May 14th. June 7th he was taken sick with typhus-fever and sent to Riverside Hospital. The man was taken ill seventeen days after he left Hamburg, where he had stopped at the lodging-house of Rafael Mendel, the same house at which three other immigrants had lodged, who arrived a few weeks previous, and developed typhus some days subsequent to their arrival in New York.

The steamer Moravia arrived March 27th, 1884, from Hamburg the 14th of the month. April 4th one of the steerage passengers by the Moravia (Wolf Alterman) was found sick of typhus-fever by the New York health authorities. On the 5th another immigrant by the same steamer, who was taken sick April 1st, was sent to the contagious hospital with the

same disease. Subsequent to the date last mentioned eleven other cases of typhus developed among the passengers by the Moravia, eight of whom had stopped at the lodging house of one Jarmoulowski in Hamburg. In this instance there could be scarcely room for doubt that the disease was contracted at the lodging-houses named. The agents of the line were directed to have the authorities at Hamburg cleanse and disinfect the lodging-houses at Hamburg, and to secure a certificate from the United States Consul that this had been done to accompany the bill of health, and in case of failure to do this, "it will compel the authorities at this port to quarantine against Hamburg so far as to detain and disinfect all vessels from that port that carry steerage passengers;" that this had been done. A failure to do this, the line was assured, would subject their passenger steamers from Hamburg to detention at quarantine.

The measures taken in the instance were entirely successful in preventing further infection of passengers from that port. There is good reason to believe that the effort being made to secure the same result at Antwerp will be equally successful.

IMPROVEMENTS AT HOFFMAN ISLAND AND SWINBURNE ISLAND.

It is with much satisfaction that I am able to congratulate the Quarantine Commissioners, at the near completion of the improvements at Hoffman Island for the proper care and observation of persons who have been exposed to infectious or contagious diseases on board vessels before their arrival at this port. The changes in the old structures and the completion of the new are nearly effected. When the work is done, Hoffman Island will be the most complete in its arrangements for a "Quarantine of Observation" in the world. Its condition, when finished, as compared with what it was in 1887, when cholera appeared at the threshold of the port, and upward of one thousand more or less infected immigrants were under observation, will afford to those who were then, and are now cognizant of the condition, the best evidence that could be given of the difficulties that were encountered in controlling the pestilence which had devastated every country that it approached in its progress to our own shores.

In a previous report the work in progress was referred to and in part described. Now that the improvements are nearly completed and many of the members of the Legislature before whom the report of the Quarantine Commissioners will be laid, are not familiar with the quarantine establishment, a fuller description will not be uninteresting.

The buildings on Hoffman Island are four in number; two original dormitories 137 × 61 feet, two stories in height, and administration building 40 × 50, and a building recently erected which is 109 × 51 feet. The last-mentioned contains twin boilers of seventy-five horse-power. These supply steam for heating, for pumps, wash-room, and for laundry and dining-rooms, which are located on the first floor. On the second floor they supply steam for the disinfecting and drying-rooms, which will be more fully described.

A portable galvanized iron partition across the island from the head of the slip to the rip-rap wall on the east side of the island, passes between the north and south dormitories so as to entirely isolate the occupants of one building from the other. A door in the partition where it crosses the coping of the concrete wall affords communication between the dormitories when it is necessary.

The interior of each of the dormitories is divided into four sections—two on each floor—one for males and one for females. The partitions making these divisions are galvanized iron, eight feet in height, and continued from the top to the ceiling by a heavy network of galvanized iron wire. The floors of the dormitories are covered with asphalt, and the walls of the interior of the buildings are to be covered with two heavy coatings of duresco, followed by metallic paint as high as the partitions, thus rendering them impervious. The berths in the dormitories are arranged in two tiers, one above the other on the sides and ends; each cot or berth made of wrought iron and so hung to the walls that they can be triced up and fastened to the wall when not in use. At the end of the dormitories where the closets were formerly located, bath-tubs have been placed—each building is supplied with sixteen bath-tubs on each floor. A two-story annex has been built on the east side and centre of each of the dormitories, with twelve seats on each story. The occupants of one of the divisions in the

dormitories can pass to and from the closets without coming in contact with those of any other division if complete isolation is desirable. Each closet is flushed from a tank above. The dejecta is received into a porcelain-lined trough in the basement of the annex, which has an incline of one-fourth inch to the foot toward the sewer.

Under ordinary circumstances the sewer end of this trough will be opened, but it is supplied with a stop valve that fits closely the opening into the sewer, when it is desirable to have the trough supplied with a disinfecting solution. A handle and chain in the closet connects with the valve by which it is opened or closed as may be desired.

The galvanized partitions external to the south dormitories are so designed as to afford absolute isolation for four groups, and give each an opportunity for closet accommodation, and to take their meals and fresh air without contact with the members of any other group. The south building was selected for this purpose from its proximity to the dining-rooms of the new building.

Three principal objects have been sought in the arrangements to which reference has been made.

First. To cover all surfaces external to and in the interior of the buildings likely to conceal or retain any infectious or contagious material, with a non-absorbent and impermeable material.

Second. The removal of the closets to annex building, and facilities for disinfecting the sewage, and thus minimize exposure to the infection from cholera-infected persons.

Third. To secure absolute isolation for several groups, and give each and every person in them access to fresh air, to the dining-room and the annex.

THE DISINFECTING PLANT.

The disinfecting plant is located in the new building designed for a boiler-house, dining-room, etc., and which is now under contract to be built. It has been changed in some respects in the last specifications. It was designed in the first instance that the sections should be composed in part of wood and partly of iron. The difficulty of securing bids on a complex structure of this sort compelled the use of iron altogether.

The exhaust pump consists of Knowles's special duplex crank and fly-wheel vacuum pump of the size known as eight inch by twelve by eight inch ; brass fitted with governor, chronometer valve, patent oiler, water seal with suction exhaust and drip connections, so arranged with valves and gates that the various subdivisions of the disinfecting-rooms may be operated singly or together.

In the disinfecting-room seven distinct coils are placed in sections ; each coil consists of two manifold headers made of four-inch extra heavy wrought-iron pipe placed lengthwise in the sections, and the full length of the same. Each header is tapped for one-inch pipe, and the holes spaced three inches from centre to centre. The headers are arranged one above the other, and into each screw one-inch pipes are connected at their opposite ends with return bend and nipples.

With the above-named top and bottom pipes are connected by return bends two additional pipes, making four in all set vertically and connecting with the one-inch holes in the steam and return headers.

The total amount of pipes placed in the seven coils described is about six thousand lineal feet. Each coil has its separate steam and return connection, with full-sized valve in each connection. The steam supply is taken directly from the power connections at each boiler, and arranged with valves in each connection, so that either one or both boilers may be used to supply steam to pumps or coils. Separate mains are provided for coil service ; the main power supply pipe for pumps are four-inch, the exhaust pipe from the pump is three and one-half inches, and extends above the roof of the building.

The location of the air suction pipe to the vacuum pump is on the ceiling of the first floor of the boiler-house, so as to best secure the purpose for which it is designed. Outlets are provided for the pipe, with connections to the sections of the disinfecting rooms. Each section is provided with a quick-opening gate valve, with lever and handle attached and arranged so that each gate may be controlled by attendants on the boiler-room floor, while the outlets in the disinfecting rooms are provided with air-tight screw-top caps so arranged as to be easily removed and replaced with a brass strainer.

The discharge or exhaust from the air chamber of the pump

is twelve inches and connected to the pump, and is extended to the chimney of the furnace. The drop connections from the pump and exhaust pipe are connected together and run into a discharge trap, with discharged connections. The return from the coils are connected into three No. 4 Nason traps; the discharge from the same is connected and discharged into the receiving tank in the boiler-room. The valves on the sections of heating coils are arranged to control coils outside of each room, each section to have two perforated pipes the full lengths of the sections perforated. Each set of pipes has controlling valves.

On the exterior of each compartment or division of the disinfecting-room are placed near the ceiling six two-inch gate valves, connected to the space running above the rooms. All the live steam-pipes in the boiler-room are fitted and covered.

Connected with each expand-pipe from the disinfecting chambers above the valve on the same is a one and one-half inch galvanized iron pipe and each connected with a two and one-half inch main pipe, which latter connects with the drip tank. Each pipe has an independent valve, and one valve on the two-inch pipe before it enters the tank. Attached to the tanks are two one and seven-eighth inch stop-cocks, with the necessary lengths of one and seven-eighth-inch galvanized iron pipe which run into the ground.

Gauges and thermometers are so placed as to indicate the pressures and temperatures of the disinfecting-rooms. For this purpose are used three high ranged thermometers, three vacuum gauges, and three pressure gauges, each having necessary valve and pipe connections with dial boards and fixtures complete.

The gate valves used are of the Ludlow double gate pattern, the other valves are of the Jenkins Brothers patent, two and one-half inches and above.

The disinfecting-rooms are made as nearly air-tight as possible. The ceilings and partitions are made of three-sixteenths iron, well lapped and riveted, caulked, and thoroughly fitted. The ceiling, floors, and partitions are lined with iron, and with doors of the same in partitions and for shutters to windows. The doors and room are calculated to withstand the pressure of seven and one-half pounds per square inch. The partitions

are secured in place by four-inch beams and angle irons, held in place by bolts and rivets bolted to the beams. Each door dividing the sections is hung and set in such a manner as to be perfectly air-tight when closed. The window shutters are made and hung the same as the doors ; all have rubber stops.

One hundred and eight galvanized iron baskets of No. 14 wire and one-inch mesh will be in position for use. Each with sufficient capacity for the baggage of one person or one family ; or, more exactly, each basket is six and one-half to four and one-half feet long, frame in wire with stiffening bands. Each series or set of three baskets is suspended and run on the same overhead tracks, so arranged as to slide out their full length.

All steam and exhaust pipes are covered with one-inch hair felt resin sized paper and canvas.

A drying-room 109 × 51 feet for baggage and clothing after it is disinfected, is connected with the disinfecting chamber by a short hall, in which a small railway and car is to be constructed, to carry the baskets from the disinfecting-room to the drying-room.

THE CREMATORY.

The crematory which was authorized by the Legislature of 1888, and for the erection of which on Swinburne Island an appropriation of $20,000 was made, has been completed, and has been used during the past year for the incineration of the remains of four persons who died at the quarantine hospital.

The removal of the dead at Seguine's Point was directed by act of Legislature of 1888. The act provided that the remains of the dead should be "disposed of in such manner as will not endanger the public health." In conformity with the statute the remains of those buried at the quarantine cemetery (Seguine's Point) have been disinterred and cremated at the crematory, and the ashes gathered to be deposited in the mortuary at Swinburne Island.

A *mortuary* has been completed at Swinburne Island, with a capacity for thirty-two bodies, for the reception of the remains of those who die at the quarantine hospital or whose religious views, as communicated by them while living, or by their friends within twenty-four hours after their decease, are opposed to cremation. Under such circumstances the Superintendent of Swinburne Island is directed to enclose the re-

mains in a sealed metallic casket, and deposit them in a niche of the mortuary. A reasonable expense attending such a disposition of the remains, or for their incineration, is chargeable to the consignees or owners of the vessel on which the deceased arrived at quarantine.

OTHER IMPROVEMENTS AT SWINBURNE ISLAND.

The fierce storms which sweep over the lower bay every year nearly completed the wreck of some portions of the structures, and seriously menaced the island with destruction during the past year. The force of the winds and sea breached the crib work surrounding the rip-rap wall, and invaded the interior of the island so as to endanger the foundation of the building. The dock and the "approach" from it to the island was so completely wrecked by the storms during the last summer and fall that a landing and passage to the hospital was made with considerable difficulty.

The repairs and substantial improvements which have been undertaken on this island are now so nearly completed that your honorable board in contemplating them are justified in having an honest pride in the fact that this, as well as other parts of the quarantine establishment referred to in this report, and in that of last year, when the present contracts are completed, will be far better equipped for the purposes for which it is designed than it has ever been, and more substantial and enduring than when the islands and their superstructures were first completed.

SANITATION OF BARRACKS.—The London correspondent of the *American Practitioner* reports a recent lecture by Dr. J. Lane Notter, at the Royal United Service Institution. He urged the importance of a clean and airy site, with plenty of sunlight; that barracks should not be erected in crowded cities. As a rule they are badly lighted, and the sooner electric light is introduced the better. Fifty years ago there were 14 deaths in 1000 from phthisis among the Foot Guards, and only 3.4 per 1000 among the civil population; but now the comparison was four civilians to three soldiers of the same age. Of 63 samples of water submitted to him for analysis last year at Netley, 29—nearly all procured from wells—were unfit for use. In conclusion the lecturer claimed that the Army Medical School had done good work in promoting sanitary progress in the army.

EDITOR'S TABLE.

☞ALL correspondence and exchanges and all publications for review should be addressed to the Editor, Dr. A. N. BELL, 113A Second Place, Brooklyn, N. Y.

THE AMERICAN MEDICAL ASSOCIATION'S FORTY-FIRST ANNUAL MEETING, held at Nashville, Tenn., May 20th–23d, 1890, fully equalled the average standard of excellence in representation and work promotive of professional advancement.

There was some complaint that the conditions of travel agreed upon were not strictly complied with by some of the railways, and that there were, consequently, some disagreeable delays.

The Old Dominion Steamship Company route, *via* Norfolk, and thence by rail, was exceptional in this regard. The commodiousness of the quarters, admirable appointments, and excellence of service on board was a delightful prelude to the subsequent daylight travel by rail through portions of Virginia and Tennessee, especially notable for the beauty of the scenery. Indeed, it may be said of this Old Dominion Steamship Company's line generally, *en passant*, that it is the most agreeable of interims of travel North and South between New York and Richmond, taking in Old Point Comfort, and connecting at Norfolk with Virginia Beach, Cob's Island, and numerous other resorts by steamboat or rail, besides its connections with the Virginia, Tennessee & Georgia Air Line, the Chesapeake & Ohio Railway, the Richmond & Danville system, the Seaboard & Roanoke Railroad, and other roads, with all which it has combination tickets.

The only disagreeable delay by this route, outward, was four hours' night wait—eight to twelve o'clock— at Chattanooga, for the sleeping-car to arrive, instead of its being at hand. On account of this *faux pas*, some chose to lose the opening session of the first day, put up at hotels for the night, and proceeded to Nashville the next morning.

The next and only other thing complained of was—what many anticipated when the place of meeting was fixed upon—the want of hotel accommodation. But this was measurably made up by the provision of the Local Committee of Arrangements at private houses.

The meeting opened with about five hundred delegates, and was heartily welcomed by Dr. W. T. Briggs in behalf of the medical profession of Nashville. In the absence of Governor Robert L. Taylor, who was unexpectedly called away, Hon. Thomas D. Craighead, State Senator, welcomed the body in behalf of the State; and Hon. C. P. McCarver, Mayor of Nashville, extended a warm welcome in behalf of the citizens.

The programme of the meeting was then announced, and the proceedings opened with the address of the President, Dr. E. M. Moore.

It is particularly gratifying to THE SANITARIAN to observe that at no previous meeting of the Association has the pre-eminence of preventive medicine been so fully presented. Besides the very full abstracts of the three special addresses on other pages of this number, and the work of the Section on State Medicine (of which more hereafter), there were several contributions to other sections much more intimately correlated to preventive medicine than to curative medicine.

The total registration during the four days was upward of nine hundred. The general sessions were held in the Vendôme, a beautiful new theatre, with good light, fair ventilation and excellent acoustic qualities. The meeting-places of the sections, though doubtless the best available, were, for the most part, too distant from the place of the general sessions, and from each other, to be as profitable as they otherwise would have been to many who wished to divide their attendance.

The Exhibition of medical preparations and publications, surgical apparatus, optical and electrical goods, and food preparations, was less extensive than that at Newport the previous year, though fully equal to it in quality and superior to it in excellence of arrangement—this latter quality being due to the good taste and superintendence of the chairman of the sub-committee in charge, Dr. J. Berrian Lindsley.

The Hospitality of the citizens was characteristic of the proverbial renown of the old South. It has survived all the vicis-

situdes of recent years, and was rarely or never more conspicuously manifest than on this occasion. It began by a joint reception by the physicians and citizens at the State Capital on the first evening. This was followed by four receptions, each subsequent evening, by distinguished citizens ; an afternoon reception by the ladies of Nashville to the wives and daughters of members of the Association in attendance ; reception by Mrs. President Polk ; a concert at the Vendôme ; excursions to the tomb of General Jackson, to the celebrated Belle Meade Stock-Farm, and to Chattanooga Mountain—the site of the famous "battle above the clouds."

In the round of entertainments the chief adornments were the ladies, who themselves served the choicest of delicacies with a grace that put every guest at ease. Everywhere round about there was a profusion of fragrant flowers which, together with the strains of delightful music the while, contributed to the general charm of the occasion.

Previous to this meeting in recent years there have commonly been a few in attendance conspicuous by their insensibility to the charms of social intercourse, ever ready to deprecate any diversions from the drudgery of continuous professional work with the same assiduity in convention as in their office hours at their seats of labor. Measured by the good work done in conjunction with the most delightful and numerously attended entertainments of the session just concluded, the result is well calculated to put to silence all such croakers.

Officers elected for the ensuing year : President, W. T. Briggs, Tennessee ; First Vice-President, C. A. Lindsley, Connecticut ; Second Vice-President, R. C. Moore, Nebraska ; Third Vice-President, H. C. Wyman, Michigan ; Fourth Vice-President, L. P. Gibson, Arkansas ; Treasurer, R. J. Dungleson, Pennsylvania ; Permanent Secretary, W. B. Atkinson, Pennsylvania ; Librarian, C. L. Richardson, District of Columbia ; Trustees of Journal, J. B. Hamilton, District of Columbia ; J. V. Shoemaker, Pennsylvania.

The next place of meeting, Washington, D. C.

PROCEEDINGS OF AMERICAN MEDICAL EDITORS' ASSOCIATION postponed to next issue.

WINES AND STRONGER LIQUORS.

NEW YORK, May 13, 1890.

A. N. BELL, M.D.,

DEAR SIR: As THE SANITARIAN is the exponent of all that pertains to public health, I am prompted to seek information at your hands which I have for some time been anxious to ascertain. Successful physicians very frequently find it necessary to use grape products in one form or another, and so much doubt exists regarding the genuineness of foreign wines, that they are at a loss to know just what to do when a case arises requiring the use of thoroughly reliable brandy. Can you tell us where we can obtain an article in which implicit confidence can be placed; and if not too much trouble to you, can you also let us know where a genuine honest Burgundy and port wine can be obtained? By answering these questions in full, I believe you will do a great kindness to thousands of physicians who will read the information with marked interest and profit.

Very respectfully yours,

F. P. MILLS.

THE SANITARIAN treated this subject very fully several years ago (Vol. 13), under the head of "The Truth about Stimulants and Narcotics;" but it is a constantly living subject, and will always remain so, because, no matter what may be the opinions of physicians, or the elucidations of science with regard to the effects of stimulants on the human system, their use in one form or another is well-nigh as old as mankind. And so long as this is the case their *quality* is of universal concern, most of all to sanitarians and physicians, whose business it is to know and designate them, wholly independent of their own personal predilections and habits.

For ourselves, the question is one of sanitation in its most comprehensive sense. But not now to argue for or against their utility, but to take them as they are, and as briefly as possible answer our correspondent.

Wine and brandy should be the uncontaminated results of the fermentation and distillation of grape juice; all that is otherwise is impure and possesses different properties.

When the Portuguese first began to export wines to Eng-

land, those usually sent were from the vicinity of Lisbon. But the demand speedily so increased as to greatly enlarge the extent of the territory, and induce English settlers, who taught the Portuguese more than a century ago how to produce a *strong red wine* by the addition of brandy and the juice of elderberries, for which the English acquired a taste which, after more than a century's use, remains unabated ; insomuch, that it is difficult, if not, indeed, impossible, to obtain an imported port wine that has not been doctored to suit the English, by the addition of brandy and elderberry juice, or some substitute for this latter substance equally or even more likely to derange the digestion and promote disease. Pure imported Burgundies are almost equally rare. When pure they are of great delicacy, and doubtless among the most wholesome of wines—and the *white* are the best. But, unfortunately, the red are generally preferred, and these are commonly colored and aromatized by various substances with but little regard to ulterior effects.

Pure brandy has the distinctive odor of the essential oil of grapes, *huile de Cognac*. But the misfortune is that this oil is largely used to counterfeit brandy by giving odor to other distillations. Moreover, in France, especially, brandy is frequently distilled from poor wine or the juice of bad grapes, such as have failed in maturing or become acid and unfit for wine—or anything else. It seems almost needless to remark that all such brandy is of poor quality—no matter how exquisitely it may be flavored—but it is abundant.

Time is an essential element in the production of good wine and brandy alike—time after fermentation and distillation required for the combination of the contained ethers and essential oils produced by fermentation and distillation. But besides, there is an acquired art in regulating the distillation of brandy, the flavor being influenced by the greater or less rapidity of conducting the process. When this is lacking, as it too often is, under inexperienced manufacturers, the product is of inferior quality and subjected to such additional treatment as may improve the flavor but aggravate the quality.

English brandy is usually prolific in *fusel oil*.

The foregoing remarks apply more or less to all imported wines and liquors ; substitution and adulteration are common practices, and the difficulty in obtaining those that are pure

is greater than it is among American manufacturers. Indeed, it has long since been demonstrated that almost everywhere south of the 40th degree of latitude in the United States the soil and climate are well adapted to the cultivation of the vine; and forty years' experience in California particularly, since Longworth so successfully exhibited the results of even a less favored region, there has been no lack of ambitious manufacturers, until some of our domestic wines and brandies will favorably compare with even the choicest importations.

True it is, as above implied, that the different conditions of climate—not always appreciable—season and soil; the different modes of culture of the vine; the different management in the processes of fermentation and distillation, and the different means in preserving both fermented and distilled liquors, all contribute to the results. But the Californians have not been slow in the acquisition of all such knowledge, and it is now concentrated to such a degree that they can well afford to challenge comparison.

Judged by samples of which we have availed ourselves of the opportunity to examine, the wines and stronger liquors sold by the California Vintage Company, New York, will compare favorably with the same varieties from any other source.

To all who are about to take their babies to the country, we earnestly commend the "Improved Baby's Portable Bath-Tub." It is the invention of Miss S. C. Neal, an accomplished trained nurse, and recommends itself at sight to all mothers who would, on going to the country, possess themselves of the most useful of all utensils for the promotion of the cleanliness and health of their babies.

It is made of pure rubber on strong drilling-cloth. Water drawn off by a faucet at the bottom. Folds up flat. Pockets for toilet articles, towel-rack, brushes, etc., and all so compactly arranged as to be portable with as much facility as a closed umbrella. To obtain it, or for any further particulars in regard to it, address the inventor, Miss S. C. Neal, 19 Clinton Place, or 27 N. Washington Square, New York.

THE PROGRESS OF INFECTIOUS DISEASES AND MORTALITY RATES AT THE MOST RECENT DATES, BASED UPON OFFICIAL AND OTHER AUTHENTIC REPORTS.

CORRESPONDENTS under this head are particularly requested to be prompt.

ALABAMA.—*Mobile*, 40,000 : Reports 59 deaths during April, of which 16 were under five years of age. Annual death-rate, 17.7 per 1000. From zymotic diseases, 7, and from consumption, 13.

Selma, 10,486 : Reports 18 deaths during April, of which 6 were under five years of age. Annual death-rate, 17.64 per 1000. There were 4 deaths from zymotic diseases, and 2 from consumption.

CALIFORNIA.—For the month of April, 1890, the Secretary's abstract of the reports received from 100 cities and towns, with an aggregate population of 825,150, the number of deaths was 1037. Annual death-rate, 15.0. Deaths from consumption during the month, 178. From zymotic diseases : Diphtheria and croup, 27 ; typhoid-fever, 20 ; cerebro-spinal-fever, 17 ; diarrhœal diseases, 8 ; whooping-cough, 4 ; scarlatina, 3.

San Francisco, 330,000 : Reports 562 deaths. Annual death-rate, 19.74.

Los Angeles, 80,000 : Reports 66 deaths. Annual death-rate, 9.9.

Oakland, 60,000 : Reports 59 deaths. Annual death-rate, 11.80.

Sacramento, 35,000 : Reports 36 deaths. Annual death-rate, 12.33.

CONNECTICUT.—*New Haven*, 85,000 : Reports for the month of April, 133 deaths, of which number 24 were under five years of age. Annual death-rate, 18.7 per 1000. From zymotic diseases there were 24 deaths, and from consumption, 13.

DISTRICT OF COLUMBIA, 250,000 : Total deaths during four weeks ending April 26th, 364, of which 111 were under

five years of age. There were 177 deaths in the colored population. Annual death-rate, 18.9. Zymotic diseases caused 39 deaths, consumption, 59.

FLORIDA.—*Pensacola*, 15,000 : Total deaths in April, 15, of which number 2 were under five years of age. Annual death-rate 12.77 per 1000. Consumption caused 3 deaths, and typhoid-fever, 1.

ILLINOIS.—*Chicago*, 1,100,000 : Reports for April, 1602 deaths, of which number 713 were under five years of age. Annual death-rate per 1000, 17.46. From zymotic diseases there were 263 deaths, from consumption, 166.

INDIANA.—State Board of Health Report for the fiscal year ending October 31st, 1889 : Population (?).

"The whole number of deaths registered within the year from all causes, exclusive of still births, is 14,722. Of this number the zymotic diseases caused 4006 deaths, of which 2029 were males and 1977 females. In 1882 for nine months the whole number of deaths caused by this class of diseases was 3200 ; in 1883, 3835 ; in 1884, 3950 ; in 1885, 4375 ; in 1886, 3733 ; in 1887, 4714, and in 1888, 4588."

The death-rates of thirteen cities with populations from 2100 to 100,000 are tabulated, but, "as will be seen, the death-rate varies from 3.8 in South Bend (23,000) to 18.5 in Cannelton (2100)" : confessedly incorrect. Indeed, it is evident from all the official information presented, there is still much to be done in this State to arouse the people to a due sense of the objects and importance of the State Board of Health. Yet there appears to be no lack of industry in the executive work of the board. Much attention has been given to the sanitary condition of the schools, asylums, and other public institutions ; and the attention of physicians has been urged to the importance of complying with the law requiring vital statistics. Notwithstanding, the existing state of apathy is almost criminal and suggestive of the necessity of more effective legislation. Several contributions on sanitary subjects by the members of the board add value to the report as an educational document worthy of dissemination among the people.

LOUISIANA.—Biennial Report of the Board of Health for the years 1888 and 1889. The chief subject of this report is the description and management of the Mississippi quarantine, with which the readers of THE SANITARIAN are already familiar. Co-ordinately with the improvements in this, however, the progress in the decline in the death-rate of New Orleans is particularly noted, though not by any means wholly due to it. The energetic sanitary work in the city, during the while, is equally commendable and doubtless of equal efficiency. Indeed, internal or municipal sanitation and efficient measures against the introduction of disease from without, are equally essential for the maintenance of public health, and no community known to us is, or has cause to be, more alive to this necessity than New Orleans.

The disposal, or, rather, the *storage* of excreta continues to be the bane of New Orleans sanitation in default of sewerage. The closets and boxes permitted are possibly as good as any other devices—if for no other reason, because they *require* frequent emptying—but they are a shame to any people, and a constant *nidus* for the introduction and propagation of disease.

The cemeteries, too, are in dangerous relations with the causes and propagation of disease, and in the light of present knowledge on other and better means of disposing of the dead than such cemeteries particularly—where bodies are interred within three feet of, or merely placed upon the surface, enclosed in boxes through which the gases of putrefaction freely pass—surely the people ought to show themselves equal to such conditions ere their intensifying relations to an epidemic ever again show themselves.

The mortality reports (of New Orleans) for the years respectively, 1888 : white, 4122 ; colored, 2179 : 6301. Population : white, 180,000; colored, 68,000: 248,000. Death-rates: white, 22.09 ; colored, 32.04 : 25.41. 1889, death-rates: white, 21.27; colored, 30.93 : 23.92. During the four weeks ending April 26th, population 254,000, there were 490 deaths, of which 145 were under five years of age. There were 178 deaths in the colored population. Annual death-rate per 1000, 25.16. From zymotic diseases there were 70 deaths, from consumption, 62.

MAINE.—Fifth Annual Report of the State Board of Health, for the fiscal year ending December 31st, 1889, summarizes

much excellent work by the board during the year and shows marked sanitary progress throughout the State. Special attention has been given to the water-supplies, school-house sanitation, the conditions of infectious diseases and the registration of vital statistics. Local boards of health have been very generally organized in the towns throughout the State, and the abstracts from their reports indicate general co-operative work. Several special reports and papers on sanitary subjects by the different members of the board and others contribute to the value of the report, which ought to be broadcast among the people.

MARYLAND.—*Baltimore*, 500,343 : During the four weeks ending April 26th there were 724 deaths, of which 275 were under five years of age. Annual death-rate, 18.82 per 1000. There were 89 deaths from zymotic diseases, and 107 from consumption.

MASSACHUSETTS.—*Boston*, 420,000 : Reports for the month of April, 785 deaths, of which number 233 were under five years of age. Annual death-rate per 1000, 22.42. From zymotic diseases there were 103 deaths, and from consumption, 114.

MICHIGAN.—The Secretary reports for the month of April, 1890 ; compared with the preceding month, the reports indicate that puerperal-fever, typho-malarial-fever, inflammation of brain, membranous croup, diphtheria, cholera morbus, and scarlet-fever increased, and that pleuritis, typhoid-fever, and influenza decreased in prevalence.

Compared with the average for the month of April in the four years, 1886–89, cerebro-spinal-meningitis, membranous croup, measles, and inflammation of kidney were more prevalent, and typho-malarial-fever, typhoid-fever, cholera morbus, cholera infantum, and intermittent-fever were less prevalent in April, 1890.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of April, 1890, at fifty-three places, scarlet-fever at fifty-four places, typhoid-fever at seventeen places, and measles at ninety-six places.

Reports from all sources show diphtheria reported at eight places less, scarlet-fever at sixteen places less, typhoid-fever at eight places less, and measles at fifteen places less in the month of April, 1890, than in the preceding month.

Detroit, 250,000: Reports for the month of April, 306 deaths, of which 55 were under five years of age. Annual death-rate, 14.39 per 1000. From zymotic diseases there were 56 deaths; from consumption, 34.

MINNESOTA.—*St. Paul*, 180,000: Reports for April, 124 deaths, of which 59 were under five years of age. Annual death-rate, 8.26 per 1000. From zymotic diseases, 15, and from consumption, 12.

MISSOURI.—*St. Louis*, 450,000: Reports for April, 660 deaths, of which number 179 were under five years of age. Annual rate of mortality 15.38 per 1000. From zymotic diseases there were 74 deaths, and from consumption, 73.

NEW JERSEY.—*Paterson*, 88,000: Reports 145 deaths during April, of which number 62 were under five years of age. Annual death-rate, 20.3 per 1000. There were 14 deaths from zymotic diseases, and 19 from consumption.

Hudson County, 292,734: Reports 560 deaths during April, of which number 235 were under five years of age. Annual death-rate, 23.0 per 1000. There were 99 deaths from zymotic diseases, and 61 from consumption.

NEW YORK.—The average number of deaths each day during April was 292; in March, 299; in February, 306; in January, 398, showing a steady diminution in the daily death-rate since the high mortality of January. The proportion of deaths under five years of age, which was very much below the average during the four months of the year, especially during January, when it was hardly half the average, has increased each month, and is now very nearly at the average rate for April. The epidemic of influenza expended itself mostly upon adults; the effects of this disease have not yet wholly disappeared, as a considerable number of deaths occurring in April were attributed to conditions resulting from it. The only zymotic disease that has a mortality above the average is measles; there

are nineteen deaths from this cause in Auburn, and numerous other localities show its increased prevalence. Small-pox developed about May 12th, at Dansville, attributed, as to its origin, to imported rags ; a considerable number were exposed, but up to the present time it has not spread beyond the family in which it first developed. The same is true at Cohoes, where it developed in March, possibly from a similar cause, and where there remains now but a single case. The high death-rate in acute respiratory diseases and diseases of the digestive and nervous systems, as also of unclassified diseases, which has characterized the bulletins for the first quarter of the year, still continues. The death-rate from consumption is very nearly that of the average for April.

New York, 1,622,000 : Total deaths, 3230–40.5 per cent under five years. Annual death-rate, 24.84. From zymotic diseases there were 475 deaths, and from consumption, 418.

Brooklyn, 852,467 : Total deaths, 1426—41.1 per cent under five years. Annual death-rate, 20.35. From zymotic diseases there were 192 deaths, and from consumption, 157.

Buffalo, 230,000 : Total deaths, 339—42.6 per cent under five years. Annual death-rate, 19.13. From zymotic diseases there were 45 deaths, and from consumption, 45.

Rochester, 130,000 : Total deaths, 208—23.0 per cent under five years. Annual death-rate, 22.69. From zymotic diseases there were 11 deaths, and from consumption, 25.

Albany, 103,000 : Total deaths, 197—35.0 per cent under five years. Annual death-rate, 22.95. From zymotic diseases there were 29 deaths, and from consumption, 29.

Syracuse, 87,000 : Total deaths, 161—31.0 per cent under five years. Annual death-rate, 22.22. From zymotic diseases there were 23 deaths, and from consumption, 23.

NORTH CAROLINA.—For the month of April there were reported 125 deaths in a population of 98,700, representing an annual death-rate of 15.2 per 1000. Deaths under five years, 30. There were 19 deaths from zymotic diseases, and 18 from consumption.

Charlotte, 13,000 : Total deaths, 19. Death-rate, 17.6 per 1000.

Ashville, 12,500 : Total deaths, 18. Death-rate, 17.3 per 1000.

OHIO.—*Cincinnati*, 325,000 : Reports for April, 505 deaths, of which number 193 were under five years of age. Annual death-rate per 1000, 18.64. Deaths from zymotic diseases, 85, and from consumption, 72.

Columbus, 101,945 : Reports for the month of April, 103 deaths, of which number 28 were under five years of age. Annual death-rate per 1000, 12.67. From zymotic diseases there were 13 deaths, and from consumption, 19.

Mansfield, 15,000 : Reports 10 deaths during April, of which number 2 were under five years of age. Annual death-rate, 8.0 per 1000.

PENNSYLVANIA.—*Philadelphia*, 1,064,277 : Reports for three weeks ending April 26th, 1227 deaths, of which 449 were under five years of age. Annual death-rate, 20.03 per 1000. From the principal zymotic diseases there were 152 deaths, and from consumption, 172.

Pittsburg, 230,000 : Reports for four weeks ending April 26th, 419 deaths, of which number 179 were under five years of age. Annual death-rate, 22.3 per 1000. From zymotic diseases there were 50 deaths, and from consumption, 34.

RHODE ISLAND.—Registration Report for 1888 : Population, 323,416. Births, American born, 3028 ; foreign, 3348—7840. Marriages, American, 1496 ; foreign, 935—3022. Divorces, 224—1 to ever 13.5 marriages. Deaths, American, 3043 ; foreign, 3551—6594. Death-rate, 20.4 ; about five-tenths in excess of the census year, 1885. Of the colored population, death-rate, 26.3.

Of the causes of death-percentage in the whole State, zymotic diseases, 25.08 ; phthisis pulmonalis, 12.13 ; pneumonia, 7.62 ; bronchitis, 3.42.

Returns for April, 1890, from nearly every section of the State, indicate that bronchitis, pneumonia, croup, scarlatina, and typhoid-fever, were considerably less prevalent than during the previous month, while diphtheria, measles, and whooping-cough were more largely prevalent, but not epidemic in any locality.

Compared with April, 1889, pneumonia, bronchitis, scarlatina, and typhoid-fever, were less prevalent during the last

month, and diphtheria, measles, whooping-cough, and croup were more prevalent.

TENNESSEE.—The principal diseases, named in the order of their greater prevalence, in the State, for the month of April, were : Malarial-fever, pneumonia, consumption, rheumatism, tonsillitis, and dysentery.

Chattanooga, 40,000 : Total deaths, 42. Annual death-rates per 1000, white, 9.33 ; colored, 19.38 ; total, 12.60.

Knoxville, 43,706 : Total deaths, 67. Annual death-rates per 1000, white, 16.56 ; colored, 25.47 ; total, 18.39.

Nashville, 68,531 : Total deaths, 94. Annual death-rates per 1000 : white, 12.84 ; colored, 22.52 ; total, 16.45.

Memphis, 56,994 : Total deaths, 98. Annual death-rates per 1000 : white, 17.72 ; colored, 24.12 ; total, 20.63.

WISCONSIN.—*Milwaukee*, 240,000 : Reports for the month of April, 319 deaths, of which number 76 were under five years of age. Annual death-rate per 1000, 15.9. From zymotic diseases there were 29 deaths, and from consumption, 35.

THE SANITARY CONVENTION at Buenos Ayres, February last, was attended by delegates from Brazil, Uruguay, and the Argentine Republic.

Among the conclusions relating to international hygiene, were the following :

First. Ships on which one or more cases of contagious diseases have occurred will be subject to the disinfection of clothes and baggage of passengers, and of such of the cargo as may be liable to contamination, and the sick will be isolated.

Second. Ships having on board persons sick with beri-beri will be considered as infected vessels. The sick will be isolated in lazarettoes prepared specially for such cases until recovery is complete, and clothes and baggage will be disinfected, as well as such of the cargo as is liable to be infected, before they can receive a clean bill of health.

MEDICAL EXCERPT is unavoidably crowded out of this concluding and index number of Volume XXIV.

LITERARY NOTICES.

A TREATISE ON ORTHOPÆDIC SURGERY. By EDWARD H. BRADFORD, M.D., Surgeon to the Children's Hospital, Boston City Hospital, and Sanitarian Hospital; Instructor in Clinical Surgery, Harvard Medical School; and ROBERT W. LOVETT, M.D., Surgeon to the Sanitarian Hospital; Assistant Out-Patient Surgeon to the Children's Hospital; Out-Patient Surgeon to the Charity Hospital; formerly Assistant-Surgeon to the New York Orthopædic Dispensary and Hospital. 8vo. Pp. 891. Illustrated with 789 wood-engravings. SPECIALTIES: Vol. III. New York, William Wood & Co.

This is a very comprehensive work on orthopædic surgery, following the example of Sayre's work, in the consideration of all deformities excepting those resulting from fractures, dislocations, and burns, and in the consideration of curative measures more elaborate. But a remark in the preface, that "the term orthopædic surgery, if it is properly defined, should include the prevention as well as the cure of the deformity," is disappointing. The consideration of "PREVENTIVE MEASURES" is confined to a section on the seats and attitude of school children, some observations on the attitudes of children during sleep, without any deductions, and a few words about corsets—the whole comprised within less than half-a-dozen pages. The relations of deficient nutriment, improper dressing, the manner of holding and carrying infants, of a foul atmosphere in early life, and the use of poisonous cosmetics, to deformities, are apparently ignored. That the function of the medical practitioner in every field is prevention as well as rescue, is no longer an open question; and limited, indeed, must be the purview of any specialty in medicine which fails to recognize and practice this twofold function. Apart from this defect, and the exclusion of the results of injuries referred to, the work before us is one of singular completeness. It comprises the clinical history, physiological and pathological conditions, and the surgical treatment of all deformities and joint diseases in

detail. It is abundantly illustrated with engravings of deformities, and of the most approved apparatus used in their treatment.

MEDICAL AND SURGICAL MONOGRAPHS, volume 6, number 2, May, 1890, contains : Insanity at the Puerperal, Climacteric, and Lactational periods, by William Bevin Lewis, L.R.C.P.; Treatment of Diseases of Women by Massage, by Dr. Robert Ziegenspeck, Munich ; The Treatment of Internal Derangements of the Knee-joint by Operation, by Herbert Wm. Allingham, F.R.C.S.; The Idiopathic enlargements of the Heart, by Dr. Oscar Frientzel, Berlin.

ELECTRICITY IN THE DISEASES OF WOMEN, with special reference to the application of Strong Currents. By BETTON MASSEY, M.D., Physician to the Gynecological Department of Howard Hospital ; late Electro-Therapeutist to the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases ; Member of the American Neurological Association, of the Philadelphia Neurological Society, of the Medical Jurisprudence Society, of the Franklin Institute, etc., etc. 12mo. Pp. 253. Second edition : Revised and enlarged. Philadelphia : F. A. Davis.

The first edition of this work, issued less than two years ago, the author informs us, prefatorily, was exhausted within a few months of its appearance. Notwithstanding, in this, several chapters have been entirely rewritten and new chapters added to maintain the progress of electro-therapeutics in this class of diseases. While the work purports to be a complete treatise on the electrical treatment of the diseases of women, it is so only in so far as the author has been able to put to the test and to particularly scrutinize such treatment as he advocates, accepting nothing upon mere hearsay ; nor does he recommend electrical treatment to the exclusion of other remedies. As thus defined, it is a particularly concise and well-written book, divested of all redundancy, sufficiently illustrated, and eminently commendable to both practitioners and students.

ALDEN'S MANIFOLD CYCLOPEDIA, volume 19. As was apparent from the first that this was to be the Cyclopedia for

"the people," each succeeding volume emphasizes the great superiority of the work for popular use over its far more costly competitors. It is remarkably comprehensive. The articles are evidently written by experts in their various lines and are carefully and skilfully edited. The results of the latest discoveries and inventions appear, many of the subjects being brought down almost to the date of issue of the volume. Among the important topics treated in this volume we notice Home Rule in Ireland; Homestead Entry, and the Homestead Laws for all the States; Imports and Exports, with figures for the United States covering one hundred years; Indians, and Indian Territory, including the opening of Oklahoma. The price is almost incredibly low, 75 cents a volume for cloth, $1 for half morocco binding. Specimen pages sent free on request. John B. Alden, Publisher, New York, Chicago, and Atlanta.

THE INFLUENCE OF ATHLETICS. From a "Topic of the Time," on "The Influence of Athletics," in the June *Century*, we quote as follows: "At the close of the recent inauguration ceremonies of the new President of Columbia, a well-known professor in another famous college, himself a Columbia man, was expressing his high satisfaction with the impression the new president had made. "But then," he added, with conviction, "he was a great foot-ball player in his day."

STANLEY'S RECENT DISCOVERY of the dwarfs in the great forest of Equatorial Africa is confirmation of Paul Du Chaillu's discovery many years ago, whose narrative, when first published, the Royal Geographical Society was inclined to doubt. His discovery is now amply verified by Stanley. Du Chaillu has condensed and rewritten his old work entitled, ADVENTURES IN THE GREAT FOREST OF EQUATORIAL AFRICA AND THE COUNTRY OF THE DWARFS, and it is just about to be issued by Messrs. Harper & Brothers. The book will contain a map and illustrations.

J. G. BROWN, N.A., has written for *Harper's Young People*, June 3d, an account of "Street Arabs I have Painted." A full-page engraving from one of the artist's characteristic paintings accompanies the article.

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